

A McGRAW-HILL
PUBLICATION

TECHNOLOGY DEPARTMENT

December
1929

First Copy

Construction Methods

Beginning:

THE DEFENSE AGAINST “OLD MAN RIVER”

A series of articles on earth-moving and other methods and equipment applied to levee building and bank revetment for flood control in the Mississippi valley.

By ROBERT K. TOMLIN

Levee building with 4-yd. walking dragline at Sikeston Ridge extension in southern Missouri



A MONTHLY PICTORIAL OF FIELD PRACTICE AND EQUIPMENT

General Construction • Highways • Buildings • Engineering • Industrial



Above: Four Ingersoll-Rand portable compressors, each of 310-ft. capacity.

Right: Seven I-R "Jackhamer" drills. These, along with other pneumatic devices, are operated by the four compressors.

Foundation Jobs

Most foundation jobs are of short duration, and the source of air power is rarely a stationary unit. Portable compressors are always economical, for they save the cost of foundations, housings, and other details of a larger installation.

I-R Portables can be used singly or in groups, as illustrated above. Discharging into a common air receiver, they will furnish plenty of air for the average foundation contract. The four units in the picture have

a combined piston displacement of 1240 cu. ft. per minute—more than enough for the "Jackhamers," the sharpener, and the oil furnace on the job.

Ingersoll-Rand manufactures a complete line of compressor and drilling equipment. The portables are available in 6 sizes, and there is a type of rock drill to meet any sort of condition you may encounter in your foundation work. Full details will be supplied on request.

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The Editor Notes --



With the Levee Builders on the Mississippi

TO PREVENT a recurrence of the floods which have taken such heavy toll in lives and property along the Mississippi River the Corps of Engineers, U. S. Army, is directing a 10-year construction program of levee building and enlargement, bank revetment and channel control involving an estimated cost of \$325,000,000. Not since the completion of the Panama Canal has the Government undertaken a great national construction project in which engineers and contractors have a keener and more widespread interest than in the Mississippi River work. Their attention, therefore, is invited to the series of articles which begins on p. 32 of this issue, under the head, "The Defense Against Old Man River."

Based upon a months' trip by the editor of *Construction Methods* down the 1,000-mile stretch of the Mississippi between Cairo, Ill., and New Orleans, the articles will discuss the job conditions and problems of the levee builders and describe in detail the varied methods and equipment that the Government forces and the contractors are using. For the field man the work this year is in an interesting stage of transition from the mule-team and hand-labor methods of the past to a process involving the application of heavy mechanical equipment.

The main operation in the building of levees is earth movement on a large scale. It is apparent, therefore, that the methods and equipment apply to fields of construction beyond the limits of the Mississippi valley. Draglines, tractors, elevating graders, crawler-mounted wagons, industrial railway outfits, tower-cableway machines, hydraulic and clamshell bucket dredges, and electrically-operated fresnos are a few of the types of mechanical equipment that are in evidence on the Mississippi work as they are, also, on other and entirely different kinds of construction throughout the country. To a degree, of course, the river work

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

ROBERT K. TOMLIN, *Editor*

Editorial Staff

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J. I. BALLARD (San Francisco)

WILLARD CHEVALIER, *Publishing Director*

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is a special problem, complicated by factors of rain, high water and the peculiar difficulties of handling the alluvial soil of the delta regions when it is wet. Nevertheless, there is, in the levee work, an interesting story for every engineer or contractor concerned with excavating equipment and the movement and grading of earth in large volume. The articles will be illustrated profusely from 350 snapshots taken by *Construction Methods*.

Next Month: Road Builders' Number

The January issue of "Construction Methods," appearing on the eve of the Convention and Road Show of the American Road Builders' Association at Atlantic City, N. J., Jan. 11-18, will be the annual ROAD BUILDERS' NUMBER. In text and picture it will present a story of outstanding developments in highway construction and maintenance during 1929.

Among the topics of major interest in next month's issue will be the application of bituminous surface treatments to low-cost roads; highway construction across swamp lands by hydraulic dredging methods; concrete road construction with different plant set-ups; a discussion of equipment depreciation and replacement; the world's longest multiple arch concrete highway bridge; typical examples of grade-crossing elimination; airport runways and landing surfaces; a pictorial feature, illustrating "kinks" in maintenance methods and equipment; paving a busy city street; heavy grading for a highway bridge approach.

Watch for the ROAD BUILDERS' NUMBER next month.

For Stabilization of Business Growth

CONFERENCES which the President began last month with important representatives of various industries are part of a program of action which has been in process of development for at least two years, since Mr. Hoover was Secretary of Commerce. They have been given added and timely importance by the wide-spread disturbance in business due to the stock market crash of last month.

The immediate purpose and effect of these conferences is to sustain and speed up construction and expansion projects which might otherwise be delayed for some time by the hesitation and uncertainty among business executives and public authorities regarding the business outlook. They were preceded by the promise of some tax reduction and by the announcement that the Federal government would somewhat advance its public building program.

The theory behind these activities is simple, logical and plausible. Tax reduction, though slight, will release some public purchasing power for direct use in ordinary trade channels. Speeding up public construction—if the co-operation of state governments can be secured—will release more purchasing power in the form of wages for those employed directly as well as in the industries supplying materials and equipment. The prospect of increased demand for ordinary consumers' goods as well as producers' goods from such sources is likely to stimulate manufacturers to maintain production schedules and to carry on with their normal programs of plant development.

Undoubtedly the President has in mind that these conferences may lay the basis for permanent organization and action of groups of business leaders looking toward long term plans for increasing the stability of business growth in this country.—*The Business Week*.

What About 1930?

IN his call for a conference of industrial leaders to consider the needs of business at the present juncture, President Hoover said:

"One of the results of the speculative period through which we have passed in recent months has been the diversion of capital into the security market, with consequent lagging of the construction work of the country.

"The postponement of construction during the past months, including not only buildings, railways, merchant marine and public utilities, but also federal, state and municipal public works, provides a substantial reserve for prompt expanded action.

"Any lack of confidence in the economic future or the basic strength of business in the United States is foolish. Our national ca-

pacity for hard work and intelligent co-operation is ample guarantee of the future.

"The next practical step is the organizing and co-ordinating of a forward movement in business through the revival of construction activities, the stimulation of exports and of other legitimate business expansion . . ."

A nation-wide survey conducted by *Engineering News-Record* shows that projects in hand and in prospect will more than justify the President in ranking construction activity as the first "practical step." All along the line, from owner to contractor, the reports show a healthy condition of the industry, strengthened, probably, rather than hurt by the deflation of stock values.

Nineteen-thirty looks like a mighty good year for construction.

Willard Chevalier
Publishing Director.

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Byers $\frac{3}{4}$ Yd. Shovel LOOKS ITS PART!



QUALITY ENGINEERING

Byers Engineering Staff has spent much time, money and effort to produce the best possible shovel design. But all this expensive engineering is worth it. For instance,—Byers machinery deck has been developed to its simplest essentials—not an extra gear to lose power, not an extra adjustment to consume operator's time.

A wonderful rig! If you've looked 'em over you can just "feel" with your first glance that Byers compact, simplified looking, easy to operate shovel says, "I'm not afraid of any $\frac{3}{4}$ yd. job!"

Careful engineering—clean cut layout of machinery—tested stresses with wide safety margins—all these show on the surface. Byers $\frac{3}{4}$ yd. shovel looks its part.

But best of all Byers $\frac{3}{4}$ yd. shovel has proved its worth in heaviest digging; has proved its ability to travel over treacherous ground; has proved its stability—not only to stand upright with good balance while working—but to stabilize costs and assure the expected net profit—that's stability,—and Byers $\frac{3}{4}$ yd. has it.

THE BYERS MACHINE CO., Ravenna, Ohio

Byers $\frac{1}{2}$ yd. full circle Bulldog Shovel, Crane, Dragline, Trencher, Skimmer

Byers $\frac{3}{4}$ yd. full circle Shovel, Crane, Dragline, Trencher, Skimmer

Byers 1 yd. full circle Shovel, Crane, Dragline, Trencher

Byers $1\frac{1}{2}$ yd. full circle Master Shovel, Crane, Dragline

Byers $\frac{1}{2}$ yd. half circle Bear Cat Shovel, Crane, Trencher, Skimmer

SALES AND SERVICE THROUGHOUT THE COUNTRY

It's the Byers
CROWD
that does it

BYERS $\frac{3}{4}$ yd.



Two of the 23 Sullivan Vibrationless Compressors at work in Snoqualmie Pass. At left, Sullivan 310-ft. Vibrationless Compressor on steel wheels. (Price \$3,500 f.o.b. factory.)

12 contractors for 45-mile road stake profits on Vibrationless Compressors

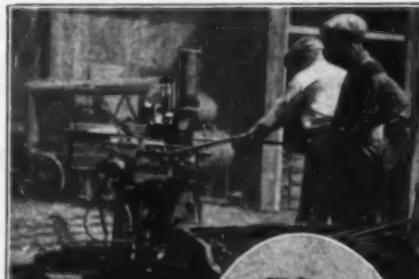
Why 23 Sullivan Compressors have been used in Snoqualmie Pass

Just as Sullivan Air Power drove the *Cascade railroad tunnel through the granite backbone of those mountains—it is now building a 45-mile highway over them.

Twelve contractors are widening and straightening the old Snoqualmie Pass Trail, and are reducing the highway grades near Spokane.

Drilling, shooting, shoveling, are isolated by forty miles of wilderness. And many dollars in overhead, for equipment and wages, have been staked on the dependability of the Sullivan Compressors. Twenty-three were purchased by the

*Eleven Sullivan Balanced Angle Compressors supplied air for three years to drive the 8-mile Great Northern Tunnel from Scenic to Berne, Washington, completed in January, 1929.



Above: A Sullivan Portable A 11 - Hammer Sharpener, making bits for the drills. At right: A Sullivan Rotator drilling ledge.



twelve contractors on the job. One, two, three compressors at a time were put on as the work progressed. All were Sullivans. For every Sullivan on the job was proving that "Vibrationless" design had banished trouble from Portable Compressors.

You, too, can profit by this new dependability in air compressors, which is helping owners of Sullivan Vibrationless Portables to shave cost estimates. Sizes 103, 110, 160, 206, 220, 310, 360 ft. are available; gasoline, electric, or Diesel engine with all mountings. *Send for Booklet 83-F.*

Sullivan All-Hammer Drill Sharpeners are also at work on The Snoqualmie Pass Road.
Catalog 72-N.

SULLIVAN AIR POWER EQUIPMENT Sullivan Machinery Company

816 Wrigley Bldg., Chicago
Offices in all principal cities of the world

AMONG FOR WARREN BROS. Boston, Mass.

HERE is one of the oldest highway contractors in the country. Their experience covers many years and every type of machine. It is significant that this concern, the builders of the great Cuban Highway, should again endorse Northwest by another purchase. One out of every three Northwests is a repeat order from a satisfied user.



NORTHWEST

NORTHWEST ENGINEERING CO.
The world's largest exclusive builders of gasoline, oil burning and electric powered shovels, cranes and draglines.

1723 Seeger Bldg., 28 E. Jackson Blvd.
Chicago, Ill., U. S. A.

This advertisement appeared in Engineering News-Record, April 25, 1929.

and now it's
NORTHWEST

CHICAGO



HELLO, George, this is Frank. Have you been past my job for the bank lately? If you want to see concrete poured, you'd better come over.

What's that? What kind of a hoist are we using?

Well, it's a Thomas and it's great.

After pouring all day it's cool. No burned out frictions as we sometimes had with cone friction rigs.

I have Old Bill running the hoist and he's as fresh as a daisy after the day is over, those frictions operate so easily.

We're going after a record on this job. And when we make it, we'll have to give credit to the Thomas.

It's the only hoist for concrete.

THOMAS ELEVATOR COMPANY

20 SOUTH HOYNE AVENUE.

CHICAGO

ILLINOIS

LAKewood CONSTRUCTION EQUIPMENT

And Now....



Adjustable to Five Foot Variation



A cast steel plow point over the ends of the center blades covers the joint and prevents clogging or gouging.



The cutting blades are mounted on slotted angles. Adjustment for crown is quickly made.

THIS means that you can get, at small additional cost, a Lakewood Subgrader adjustable from 15 to 20 feet or 20 to 25 feet, in one foot variations. No extra change parts to buy—just extend the frame out to the desired width for the particular job at hand.

The advantage of a Subgrader, in saving time and money, is now generally recognized. Think of having one machine adjustable for 15, 16, 17, 18, 19 or 20 feet.

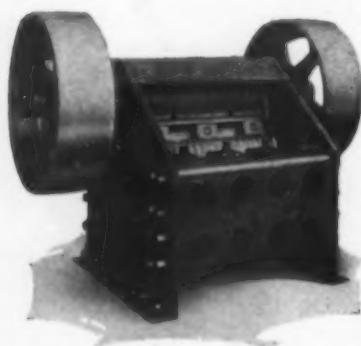
The improved transportation wheel mounting means real safety and the Subgrader still saves its cost in every mile of road you build.

Complete details in Bulletin 46-C

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The Lakewood Engineering Co., CLEVELAND • O.



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In addition to Crushing and Plant Equipment "GOOD ROADS" products include—Motorized Graders—Heavy Bituminous Distributors (heater type)—Cold Oil Distributors—Road Rollers—Chip and Sand Spreaders and Snow Removal Equipment.

PLANTS THAT PAY

ENGINEERED and installed to meet the local conditions—producing a quality product—at the minimum cost per ton—"GOOD ROADS" plants are Plants that Pay! Let us prove it to you.

Champion Reduction Crushers are Equipped Throughout with

SKF

SELF-ALIGNING BEARINGS

**CHAMPION PRIMARY
ROCK CRUSHERS**

Feeding—Elevating—Conveying—Screening—Washing—Storage and Transmission Equipment. Complete Plants of any capacity engineered and installed.

**1930
CONVENTION &
ROAD SHOW
A.R.B.A.
ATLANTIC CITY N.J.
JAN. 13-18**

EXHIBIT No. 518
Exhibition Hall



The Good Roads Machinery Co. Inc.

KENNETT SQUARE, PA.

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BUILDING FOR A GREATER TOMORROW

Up goes your dipper—steadily, surely, relentlessly forcing its way through solid earth that breaks and crumbles, rolls and tumbles — while spectators gather, fascinated and awed.

In a thousand and one places, in many lands, the constructors of today are digging — building for a greater tomorrow! And depending on Bucyrus-Erie shovels for unfailing performance.

World leadership of this half-century old organization is based, first of all, on a true knowledge of the equipment needs for each and every excavating job. Knowing these needs, Bucyrus-Erie has developed each machine to do the special work it is built for — maintaining in each the proper distribution of weight, the correct application of power, and the true relationship of every part that must exist for dependable, low-cost operation and long service.

Small shovels, large shovels — any type for any job — Bucyrus-Erie builds them all. And follows each sale with world-wide service!

Tell us about your job—and let our engineers make recommendations.

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Plants: South Milwaukee, Wis., Erie, Pa., Evansville, Ind. General Offices: South Milwaukee, Wis.
Branch Offices: Boston, New York, Philadelphia, Atlanta, Birmingham, Pittsburgh, Buffalo, Detroit,
Chicago, St. Louis, Dallas, San Francisco.
Representatives throughout the U. S. A. Offices or distributors in all principal countries.



Power shovels, clamshells, cranes, drag-lines, dragahovels— $\frac{1}{2}$ to 16 yard capacity—electric, steam, gasoline, Diesel, gas + air, Diesel + air.
Dipper, hydraulic and placer mining dredges. Tower-excavators and Railway cranes.

A-7-12-29-CM



Steep Grades Easy!



POWER and traction are two other factors that have made "Iron Mules" incomparable for short-haul dirt moving.

Steep grades and soft going come easy to this powerful, soft-stepping, sure-footed tractor dump that has all the advantages of a tractor and truck combined, minus their disadvantages.

Up—up it goes with its 2 or 4-yard load. Through gumbo or rutted going—over dirt or paved roads. The way can be as level as a pool table, or as treacherous and uneven as "No Man's Land." Hail, rain or shine the "Iron Mule" will go and keep going while the driver stays with it.

A huge 2 or 4-yard dump body mounted on the McCormick-Deering Tractor, Model 20 is the "Iron Mule." The 2-yard is gravity dump, the 4-yard is equipped with power hoist and crawler tracks. Contractors who have paid "hard cash" for "Iron Mules" will tell you that these tractor dumps are more profitable than trucks or teams for short-haul dirt moving. Ask for names.

Why the Excitement?

That will be the question of all Road Show visitors that come anywhere near the Hughes-Keenan Company's booth.

Never has there been a power hoist as unique in design, as effective in operation, as moderately priced as the one Hughes-Keenan is going to exhibit at the 1930 Road Show.

Every truck will be power hoist equipped eventually. It's progress. Only the cost of power hoists have kept contractors using gravity and hand hoist dumps. The moderate price of this new Hughes-Keenan Hoist overcomes this.

Come and see it. Also, "Iron Mules", the tractor dumps with "pulling traction", and the dump bodies that are as rugged as a Pennsy Coal Car.

Send Coupon for Folder

The Hughes-Keenan Company, Mansfield, Ohio.
Gentlemen:

Please send without obligation your free illustrated "Iron Mule" folder and dump body literature.

Name _____

Address _____

City _____ State _____

THE HUGHES-KEENAN CO., MANSFIELD, OHIO

IRON MULE

TRACTOR DUMP
MOUNTED ON MCCORMICK-DEERING

A Mouthful At Every Bite

... And Endurance for the Hard Jobs

Strength and stamina steels the Heavy Duty Type "D" Owen Bucket for severe duty and difficult digging. It gets remarkable grabs without fail in shale, stiff clay, broken rock and other hard materials. It comes off the job unsathed, ready for another with the same power and resistance. Type "D" Buckets stand up for the Owen Guarantee—"A bigger day's work, longer life and no breakage." What could be more positive? Write for the Folder giving details of this durable Owen.

THE OWEN BUCKET COMPANY
6023 Breakwater Ave. Cleveland, O.



Owen Buckets

—study modern bridge building methods—

using McKIERNAN-TERRY HAMMERS

—naturally!

These hammers were used in great numbers on many notable highway bridge operations during the past year.

Noteworthy among these is the new Fort Lee Bridge, which will connect New York and New Jersey; and the International Bridge at Detroit (not shown on this page) connecting the United States and Canada. In addition to these big jobs, McKiernan-Terry Hammers have been widely used by the railroads on bridge construction, track elevation, etc.

Send for fully illustrated catalog.

McKIERNAN-TERRY CORPORATION

14 Park Row, New York City

MANUFACTURING ENGINEERS

WORKS: DOVER, NEW JERSEY

*Pile Hammers, Drilling Machinery,
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and Accessories*

NATIONAL HOISTING ENGINE DIVISION

WORKS: HARRISON, NEW JERSEY

*Steam, Gasoline and Electric Hoists,
all types and sizes*

STEELE & CONDICT DIVISION

WORKS: JERSEY CITY, NEW JERSEY

*Machinery and Equipment for all types of
movable bridges*

On November First, the McKiernan-Terry Drill Company changed its corporate name to McKiernan-Terry Corporation and acquired ownership of and became the successor to the National Hoisting Engine Company of Harrison, N. J., and Steele & Condict, Inc., of Jersey City, N. J. The consolidation of three firms with products going into the same fields has been effected to provide adequately for greater business expansion.



A tip to State Highway Bridge Engineers

Naturally more interested in getting the job done properly than in cost and efficiency, McKiernan-Terry Hammers are used in this particular job. All piles were driven in soft sand, with a 100-ton pile driver. The hammer was used in the following manner:

In 8 hours, 500 ft. of 60-ton piles were driven in such difficult soil that it took 100 ft. to get over 100 ft. penetration. The hammer was used in the following manner:

McKiernan-Terry Hammers installed from beginning to end. W. C. S.

W. L. General Contractor, McVey, Resident Engineer, McKiernan-Terry Cards?

VAN-TERRY DRILL COMPANY

Pile Hammers—Lifting Jibs

PARK ROW, NEW YORK CITY

Works in New York

Manufacturing Engineers

Hoisting Engines

Sheet Piling

Double Acting Hammers

etc.

—above
NEW JERSEY

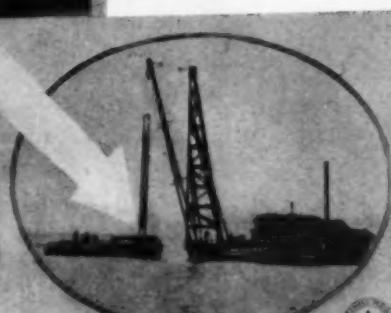
California uses them, too



Here is a McKiernan-Terry 9B Hammer driving 45' timber piles in approximately 10 ft. penetration in soft ground near the San Gualberto River near Arco, California. In California as in other parts of the United States for all general pile driving purposes, McKiernan-Terry pile hammers are rapidly becoming the standard type. These hammers are readily adaptable to many forms of pile driving work, none of which are now portable. Their double-acting capability, low operating costs, one long feature—will be glad to explain upon request.

Have you the McKiernan-Terry Catalog?
McKIERNAN-TERRY DRILL COMPANY
Pile Hammers—Lifting Jibs
14 Park Row, New York
Works in New York

Going down
35 ft.
under water



—that's how this



Driving
1600 tons of 45' to 85'
Steel Sheet Piling

The general contractor, Sloss Bros. Co., Inc., of New Jersey, engaged in the construction of the New Jersey Turnpike, required the use of 1600 tons of 45' to 85' long sheet piles. The size of the foundation was determined over and the total weight required to embed each was 20 tons or 25 ft.

To take the unobstructed weight of the top of the piles above the bearing surface, the foundation was built up to 10 ft. above the bearing surface.

On suitable jobs, as over the important wharf areas, piles are driven in almost "standing practice" to save McKiernan-Terry Hammers.

McKiernan-Terry Hammer drives 80 ft. piles

McKiernan-Terry Hammer
drives 80 ft. piles

—above
FLORIDA

—left
NEW YORK

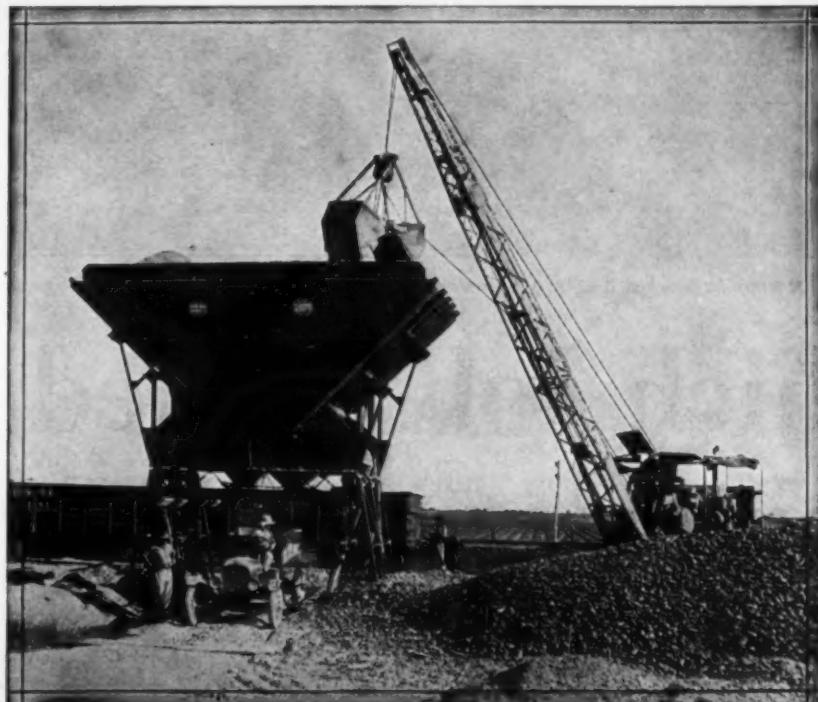


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RED-STRAND

REG. U.S. PAT. OFF.

WIRE ROPE



For Economical Wire Rope Service

The exceptional strength and sturdiness of "HERCULES" (Red-Strand) Wire Rope enable it to handle a large tonnage for each dollar of its cost, and its dependability eliminates unexpected and costly tie-ups.

Furthermore, "HERCULES" (Red-Strand) Wire Rope is made in both Round Strand and Patent Flattened Strand construction in order to meet all working conditions. We recommend it especially for use on cranes, derricks, dredges, excavators, hoists and shovels.

If you will tell us how you use wire rope, we shall be glad to suggest the construction we consider best for your work. Your inquiry will not obligate you in the least, and it may lead to a big saving. We would appreciate hearing from you.



Made Only by **A. Leschen & Sons Rope Co.** *Established 1857*

5909 Kennerly Avenue

ST. LOUIS

New York

Chicago

Denver

San Francisco



A heavily loaded Western Crawler dump wagon going over a soft spot on the Empire Refinery Job.

Which Job Earned the Most Money?

A Northern Indiana contractor has finished grading for two new refineries where the haulage conditions were similar and both bad. Here is the record. Which job netted him the most money?

	JOB "A"	JOB "B"
Yardage	575,000	700,000
Time	16 months	6 months

One-fifth greater yardage in a little more than one-third the time.

Western Crawler Dump Wagons are even more efficient where the going is good, for they can be pulled in trains of two—14 cubic yards and more each trip at tractor speed, and 24 hours a day.

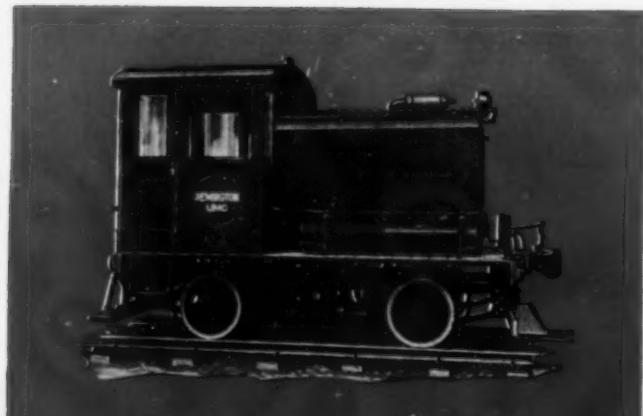
Times have changed. You are handicapped from the start without Western Crawler dump wagons.

Three sizes, direct hitch or tongue hitch. Write for circular No. 29-AD, or get in touch with our nearest representative.

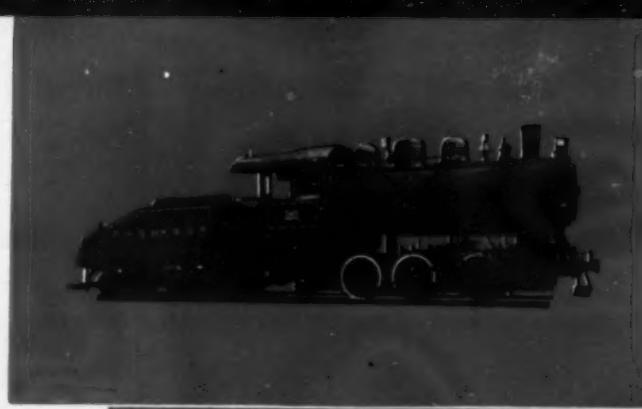
Western Wheeled Scraper Company
Aurora, Illinois, U. S. A.

WESTERN
Western
DUMP CARS AND GRADING EQUIPMENT

A TYPE
AND SIZE
FOR EVERY
INDUSTRIAL
REQUIREMENT



P O R T E R L O C O M O T I V E S



Steam, Fireless, Gasoline or Gasoline-Electric—which best fits the job?

That is a question which our engineers will be glad to answer for you from an impartial standpoint, since all types are included in the famous Porter Locomotive line.

The fact that Porter Locomotives are in daily use in every conceivable haulage service throughout the industrial world, illustrates the wealth of experience available by this organization in the economic solution of your haulage problem.

Avail yourself of this cooperative service. It may be the means of saving thousands of dollars in operating and maintenance costs. Your inquiry will incur no obligation, of course.

**H. K. PORTER COMPANY
PITTSBURGH, PENNA.**

Established 1865



NEW YORK OFFICE: 44 Whitehall St.

CHICAGO OFFICE:
Engineering Bldg., Wells St. and Wacker Drive

The FLASH-FLASH-FLASH

of the Eveready Portable Flasher
*makes a certain warning signal for municipal or county
highway systems or temporary traffic hazards!*

HERE is a warning signal that is *always* ready—*always* sure. The Eveready Portable Flasher has a penetrating *flashing* signal. This *intermittent* warning light attracts the eye—flashes danger in the thickest of nights, rain or storms, and through daylight too.

Four long-lasting Eveready Dry Batteries supply certain light for two to three months at a time, or longer. This keeps maintenance charges down to a minimum. Once the flasher is installed it operates automatically—requires no human attention. Ideal for highway warning signals.

City managers, superintendents, road commissioners have found that the Eveready Portable Flasher saves them money. Many are instructing their department trucks to carry a flasher as standard equipment for emergency warning purposes. For tow-cars, and heavy stationary objects temporarily obstructing traffic lanes, these flashers are ideal.

The Eveready Portable Flasher is sold through National Carbon Company's distributors.

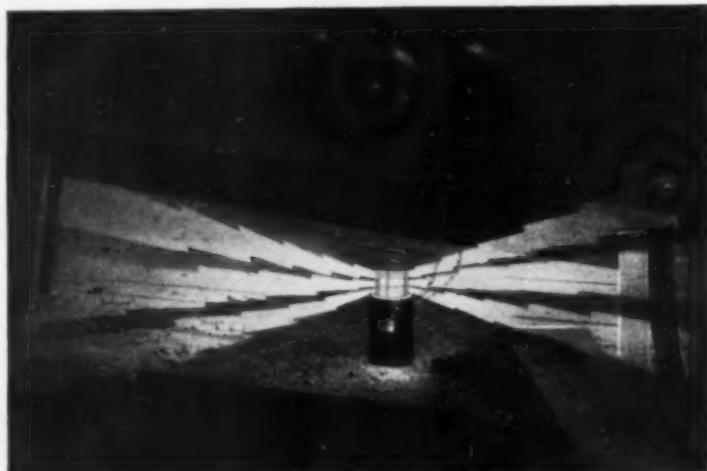
NATIONAL CARBON CO., INC.

General Offices: New York, N. Y.

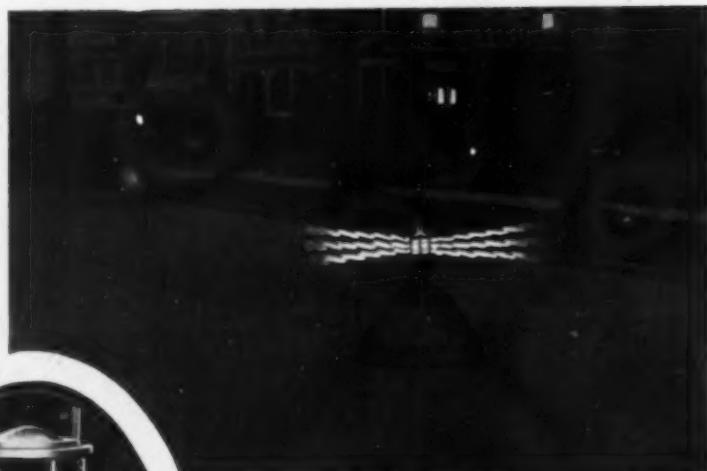
Branches: Chicago Kansas City
New York San Francisco

Unit of
Union Carbide UCC and Carbon
Corporation

EVEREADY
TRADE MARK
PORTABLE FLASHER
—dry battery operated



For construction work



As a traffic warning

SPECIFICATIONS—Height 16 inches. Diameter of base 7 inches. Weight, including batteries, 16½ pounds. Requires four standard Eveready 6-inch Dry Cells connected in series to deliver 6 volts. Extra 6-volt lamp inside battery housing. Battery compartment constructed of seamless steel attractively finished in red. Top of flasher cadmium plated for weather protection. Heavy fresnel-type glass lens in red or other colors. Padlock for battery compartment with an extra-long hasp so that the device can be chained. This flasher is of rugged construction throughout and entirely weather-proof.

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BALTIMORE, MARYLAND

*Designers and Manufacturers
of*

Modern Hydraulic Dredges

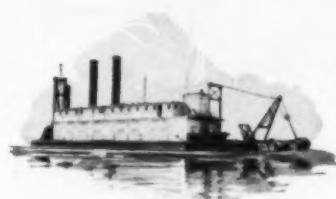
ANY SIZE—ANY TYPE—ANY SERVICE



SIX INCH TO TWELVE INCH. With any type and power of prime mover consistent with good practice.



SIXTEEN INCH. Electric, Diesel, Diesel-Electric, Turbine, or Turbo-Electric, up to 1000 horsepower.



TWENTY INCH. Electric, Diesel, Diesel-Electric, Turbine, or Turbo-Electric, 1000 horsepower to 3000 horsepower.



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THIRTY INCH. Electric, Diesel-Electric, Turbine or Turbo-Electric, 4000 horsepower to 7000 horsepower.

We are also prepared to submit recommendations and perform the work of CONVERTING obsolete dredges, by the installation of modern motive power.

Consult us and save engineering expenses. Catalogs and information about any type or size gladly sent to those interested.

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MACHINE CORPORATION

BALTIMORE

MARYLAND

New



Applying COLAS by means of a pressure tank. COLAS because it is applied cold may be used at any temperature above freezing.



Completed COLAS roads—non-skid, weather-proof and durable under heavy traffic. Open for traffic almost immediately after surfacing.



An emulsion of pure
unfluxed, straight-run
asphaltic bitumen.

COLAS

in this country

—but 7 years of success in England
and 4 years in Germany and France



the perfected low-cost ROAD BUILDING METHOD

—if you are responsible for the construction and maintenance of roads in your district, you should know about COLAS. COLAS is the modern solution of municipal, suburban and county road problems, affecting both main highways and secondary roads. By its use, macadam and gravel roads can be quickly and economically treated to provide a smooth, hard, waterproof surface.

Methods of applying COLAS are extremely simple, requiring a minimum of time and equipment. There is no heating to be done, either at the point of loading or on the job. COLAS is applied cold from a standard pressure tank or other equipment capable of producing a fine, even spray. After application of COLAS a top dressing of fine gravel, crushed stone or other suitable material completes the surface.

FLINTKOTE ROADS INC.

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Pershing Square Building
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ASSOCIATED COMPANIES THROUGHOUT THE WORLD

builds durable low-cost roads

Champion Hi-Speed Belting

Champion Hi - Speed Belting has strength—flexibility and long life. Special construction and special materials have resulted in a belting for difficult work such as only a real champion can do.

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CHAMPION HI-SPEED
The Super Service Belt



YEARS of active competition in all lines of rubber using industries, have established for Republic a fine reputation for high quality, endurance and economy. Years of marketing have taught Republic that the Industrial Supply Distributor can best serve both consumer and manufacturer. His intimate knowledge of credit, supply and demand; his warehousing services and his well equipped sales force mean lower distribution costs for us—a saving which returns to you in better quality. Republic distributors can help you solve your rubber problems.

THE REPUBLIC RUBBER CO.
Youngstown, Ohio

Belting - Packing - Hose
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TREMENDOUS POWER

that keeps things moving when the going is hard

YOU get the most power for your money when you buy Allis-Chalmers Monarch Tractors. Both the "75" and the "50" offer the lowest cost drawbar horsepower of any tractor in their class. Unusually long tracks give Monarchs traction that enables these tractors to meet every emergency. They have the tremendous reserve power that keeps things moving when the going is hard. Write for prices and complete details.

ALLIS-CHALMERS MANUFACTURING CO.
Specialists in Power Machinery Since 1846
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Allis-Chalmers
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Tractors



Protecting lake shore properties with Lackawanna Steel Sheet Piling

In recent years, high water and devastating storms have done serious damage along the Great Lakes, washing away beaches and cutting into the banks of shore properties.

Walls constructed of Lackawanna Deep-Arch Piling, Section DP165, are being extensively used to protect lake shore properties against destructive storms and high water. This method is proving completely effective. One special advantage of the Lackawanna Deep-Arch Piling Wall is the deep-troughed face, which breaks up wave action and causes the sand to deposit directly against the wall.

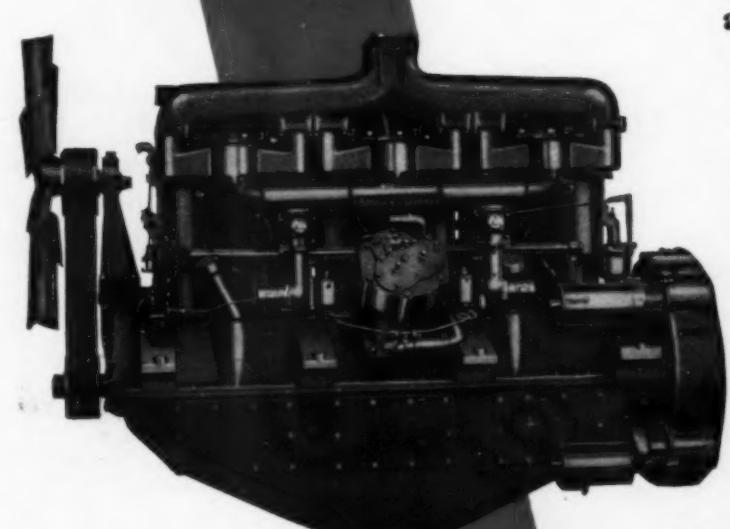
The wall shown in the two illustrations, which protects the sand bank of a residence facing Lake Michigan, consists of Deep-Arch Piling in lengths of 14 to 25 feet. It was built by G. O. Reed, Contractor, of Michigan City, Ind., who has built a number of walls of this type.



BETHLEHEM

Bethlehem Steel Company, General Offices: Bethlehem, Pa. District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, St. Louis, San Francisco, Los Angeles, Seattle, Portland, and Honolulu.

Power



SMOOTHER power, more economical power, surplus power—that's what the Le Roi Engine provides. It boasts of greater flexibility, greater acceleration and less vibration.

It's the power that gives action to most construction jobs—the power upon which the majority of contractors depend for profit. Le Roi's the power of wide acceptance and second to none for economy of operation.

1930—Road Show—Atlantic City

LE ROI COMPANY, Milwaukee, Wis.

**LE ROI ENGINES
3 to 180 HORSE POWER**



THIRTY-SIX PLYMOUTHS HAVE HELPED BUILD WAYNE COUNTY MICHIGAN ROADS

Saving carried on a consistent road building program for the past eighteen years, the Wayne County Road Commissioners have developed one of the largest road building organizations in the world.

Their building program has averaged fifty miles of new roads in the past six years—mostly hard surface roads, and nearly all twenty feet wide. This is in addition to replacements, repairs and the widening of an average of twenty miles of old roads per year.

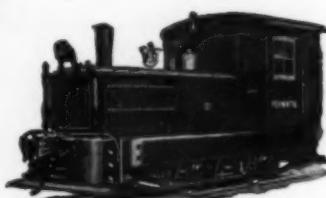
Thirty-six Plymouth Gasoline Locomotives have reduced their haulage cost and increased their yearly mileage by placing materials on spot, rain or shine.



If it's a Track Haulage Problem
There's a PLYMOUTH to Solve It

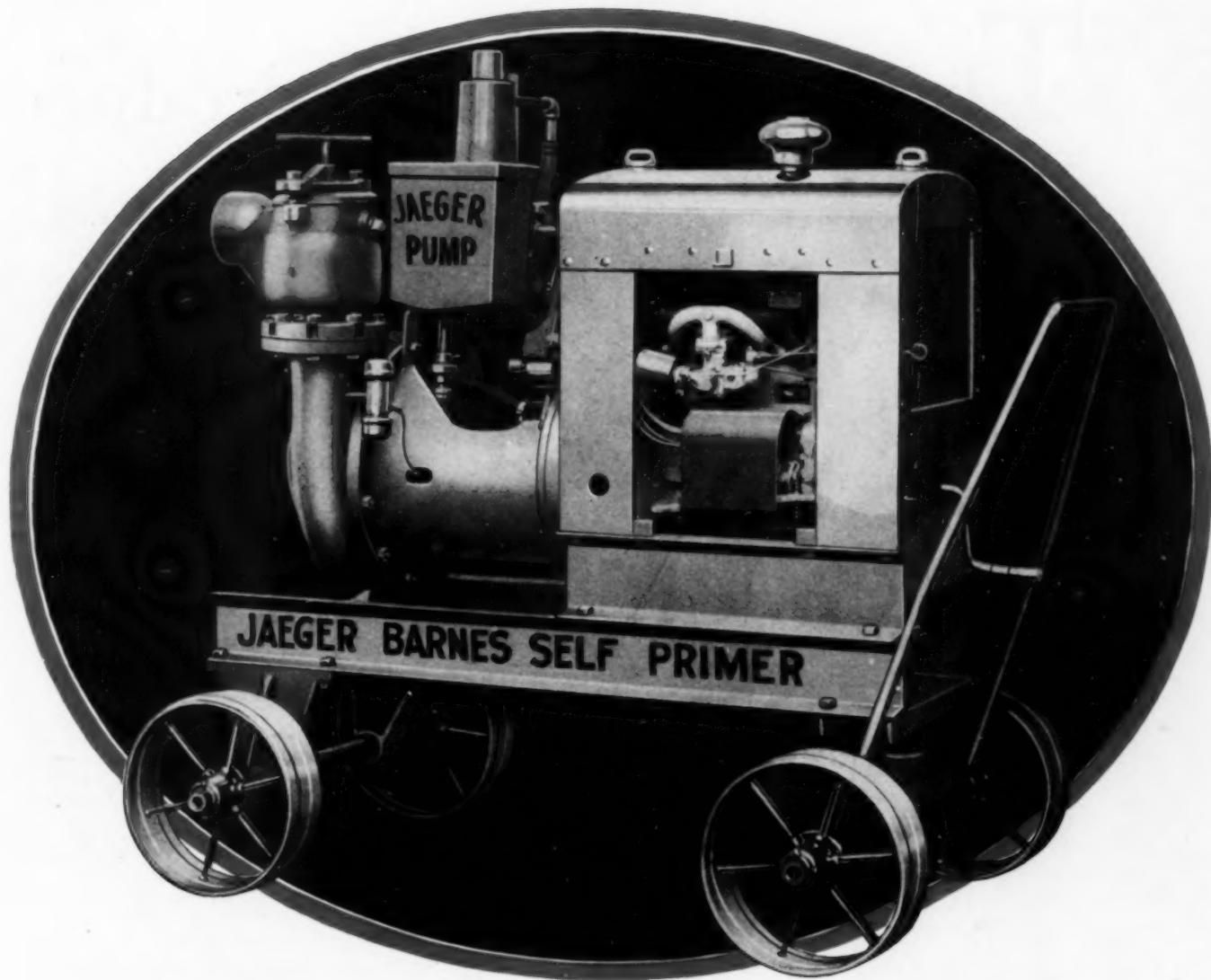
PLYMOUTH LOCOMOTIVE WORKS
The Fafe-Root-Heath Company
PLYMOUTH, OHIO

1930
CONVENTION &
ROAD SHOW
A. R. B. A.
ATLANTIC CITY, N.J.
JAN. 13-18



The PLYMOUTH 25-ton gasoline locomotive specially built for heavy hauling and shifting.

PLYMOUTH
Gasoline Locomotives



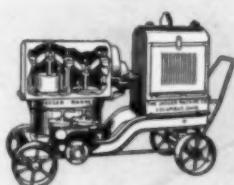
Always Ready to Pump

*Priming and Foot Valves are Abolished with
this 100% SELF-PRIMING Line of Centrifugals*

All advantages of other types... plus 3 times their capacity! Lift of 27 ft....5 to 10 ft. more than ordinary centrifugals! Muddy water won't clog it! Absolutely automatic...maintains continuous high vacuum! Primer

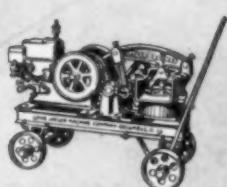
increases lift and volume! Simplest vacuum pump ever designed... just one moving part! All working parts run in oil bath! Sizes for biggest and smallest jobs... with gasoline or electric motors.

Get new 1930 prices on Jaeger-Barnes line of TRIPLEX ROAD PUMPS
DIAPHRAGM, PLUNGER and CENTRIFUGAL PUMPS!

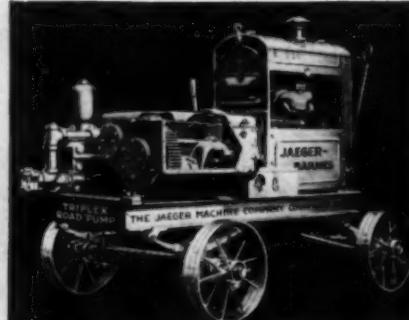


DIAPHRAGM
PUMPS

PLUNGER
PUMPS



TRIPLEX ROAD PUMPS



JAEGER MIXERS-PUMPS HOISTS—Information Slip

The Jaeger Machine Company
800 Dublin Ave., Columbus, O.

Send catalog and prices on
Pumps Non-Tilt Mixers
Tilters Timken Roller Hoists

Name _____

Address _____

That's an Elastite product there!



THE heavily traveled, surface-smooth Avenue "U" at Brooklyn, N. Y. Protected against expansion and contraction stresses by Carey Elastite Expansion Joint, installed longitudinally as well as transversely.

And that's why the road — stays — so — smooth

THE concrete is wrinkle-proofed—perfectly and permanently protected by Carey Elastite Expansion Joint. Notice that the joints are installed lengthwise as well as transversely—a doubly effective safeguard against expansion and contraction strains.



CAREY ELASTITE EXPANSION JOINT is made in sandwich form. An inner filling of special asphalt composition, holding outer-sheets of asphalt-saturated felt, both prepared at Carey's own plant and preformed under pressure. Easily installed, in any weather. Its protection is lasting and its cost is but a fraction of the finished construction job. Write for particulars on Expansion Joint installation.

THE PHILIP CAREY COMPANY, Lockland, CINCINNATI, OHIO

Carey
Elastite
EXPANSION
JOINT

The City of Syracuse, with snow tying up traffic, called on Universal Truck-Cranes to remove the snow. They did—in a hurry—and saved the city \$2.00 a truck load.



\$1211.00 in August; \$1063.00 in September; \$1037.00 in October—this is the record of earnings of one of the six Universal Truck Cranes owned by an Ohio Crane Service Co.

WITHIN a radius of 50 miles of your headquarters there are, right now, a practically unlimited number of "short crane jobs," that a Universal Truck Crane will handle at a profit to yourself. ¶ These photographs show a few of the types of jobs, on which Universals earn real money.

THE UNIVERSAL CRANE COMPANY · Lorain, Ohio



Making mobility count... on the way to a basement excavation job, this Universal Truck Crane stopped long enough to place a chimney stack, earning \$25.00 extra in less than 2 hours.



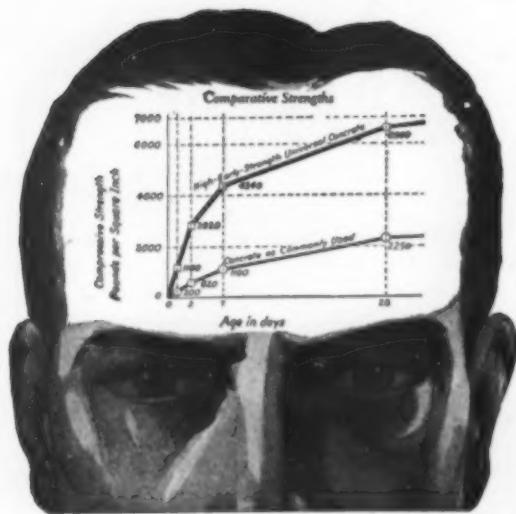
Money saved for the factory owner, money earned for the Truck Crane owner....this Universal cut the cost of loading iron scrap, handling the material with a clamshell bucket.



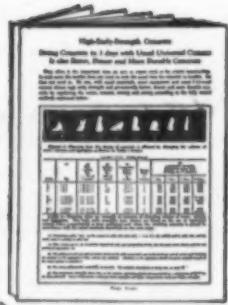
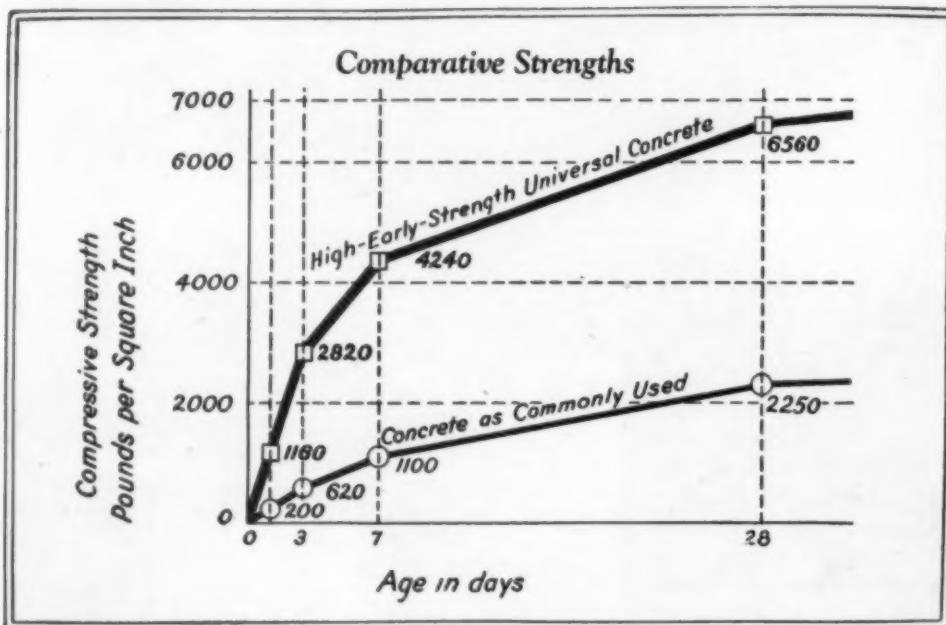
With the traveling speed of a truck, and the versatility of a $\frac{1}{2}$ yd. crane, Universals make a specialty of handling "short crane jobs" at a profit. You can rent these machines from any of the Crane Service Companies located throughout the United States.



UNIVERSAL



Something to Keep in Mind



Send the coupon
for your copy

Name _____

Address _____

Universal Portland Cement Co.
208 So. La Salle Street, Chicago
Without new obligation, please send me
details for securing strong
concrete in 3 days with
the usual materials
and labor.
C. W. 12-39

A working knowledge of the latest information on high-early-strength concrete becomes more and more vital to all builders.

The above graph gives an instant and lasting idea of both high early and high permanent strengths obtainable with the usual Universal portland cement. The booklet at the left is chock-full of photographs with brief descriptions of jobs on which High-Early-Strength Universal Concrete has saved both time and money. Condensed, easy-to-use tables give the methods by which it is made.

Store the facts contained in both graph and booklet where they'll be ready for use when next you need 3-day concrete or water-tight, durable concrete!

Universal Portland Cement Co.

Subsidiary of United States Steel Corporation

Chicago Pittsburgh Minneapolis Duluth Cleveland Columbus New York

Concrete for Permanence

Construction Methods

A McGRAW-HILL PUBLICATION—ESTABLISHED 1919

ROBERT K. TOMLIN, *Editor*

VOLUME 11

NEW YORK, DECEMBER, 1929

NUMBER 12



BY REMOVING the dipper and arm from a Byers $\frac{1}{2}$ -yd. trench shovel, Ralph Bucci & Co., Pittsburgh, adapted the machine to excavating and pipe-laying use inside a half-round sewer of 13-ft. clearance under the Homestead Steel Works, Homestead, Pa. A $\frac{1}{2}$ -yd. clamshell, operated on the shovel boom, dug a trench 4-ft. deep in the bottom of the large sewer tunnel. To lay the sections of 36-in. reinforced concrete pipe in the trench, a hairpin pipe hook was substituted for the bucket. The contractors built this 36-in. sanitary sewer through the entire length of the 1,000-ft. storm sewer tunnel.

Hot water from the steel mill running constantly into the stream which flows through the tunnel and the possibility of a 6-ft. rise inside the storm

sewer in case of heavy rain added to the difficulties of the construction crew. Although sealing the joints with tar before moving ahead delayed the con-

*Modified Shovel
Builds
SEWER
WITHIN
SEWER*



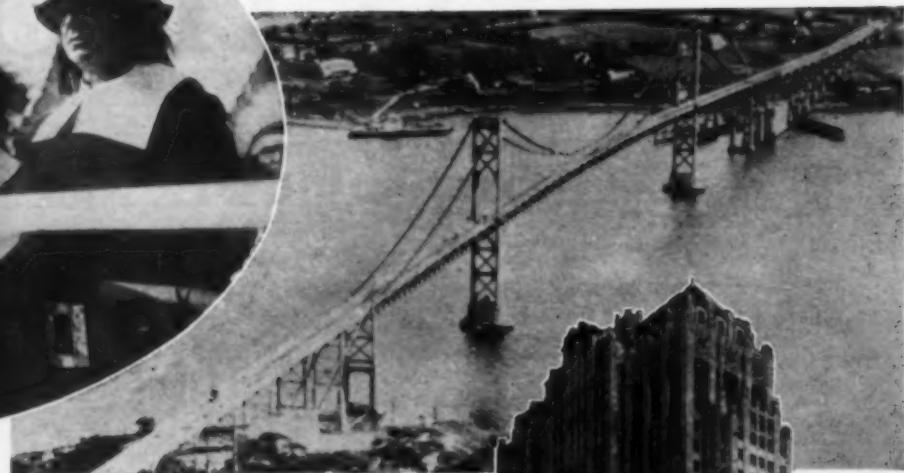
verted machine to a great extent in its progress, construction of the 36-in. sewer advanced at the rate of 80-ft. every 10 hours.

This Month's



© Wide World

"JOHN CLARK" and "ROGER WILLIAMS" exchange compacts at dedication of Mount Hope suspension bridge (right). Bridge, which has 1,200-ft. main span, replaces ferry crossing on highway from Providence to Newport, R. I. Breaks in cable wires forced dismantling of structure last spring after it had been completed to point of pouring concrete floor. Dismantling was described in *Construction Methods*, July, 1929, pp. 46-50.



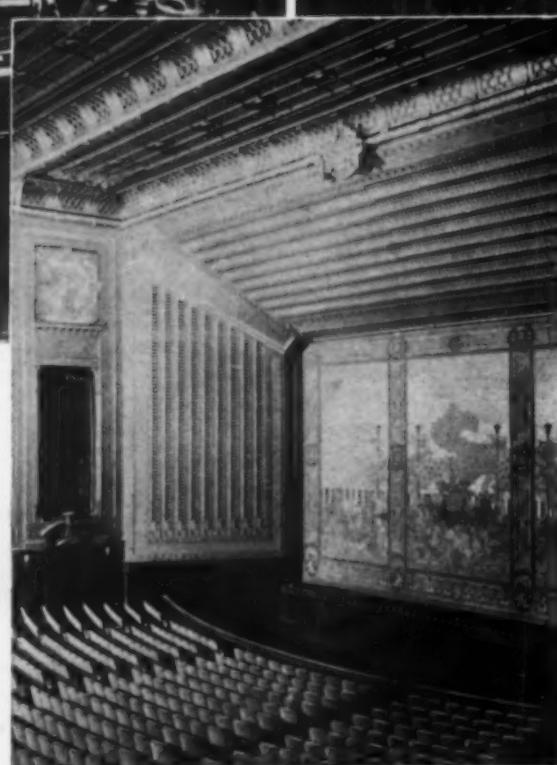
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MOUNT HOPE BRIDGE is opened to traffic approximately 7 months after McClintic-Marshall Co., general contractor, began dismantling almost completed structure. Keystone State Corporation, cable sub-contractor, replaced failing cables.



© Wide World

BANQUET ON CREST OF PARDEE DAM is feature of dedication ceremony marking completion of structure on Mokelumne River by Atkinson Construction Co. for East Bay Municipal Utility District, comprising Oakland and eight allied California municipalities. Dam, 358 ft. high above stream bed, has crest length of 1,337 ft. and contains 615,000 cu.yd. of concrete. Construction (described in *Construction Methods*, March, 1929, pp. 54-56) took 24 months, in one of which, a concrete-placing record of 67,565 cu.yd. was made.



December, 1929—CONSTRUCTION METHODS



OFFICE BUILDING, 45 stories high, at 20 Wacker Drive, Chicago, houses both civic opera and civic theater. Opera auditorium (left) seats about 3,600 persons and has stage some thirteen stories in height. John Griffiths & Son Co., Chicago, general contractor; Graham, Anderson, Probst, & White, Chicago, architects.

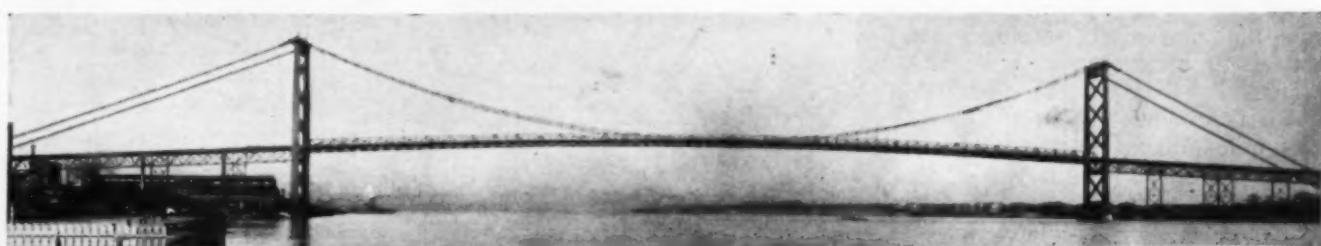
"News Reel"



ONTARIO SHAKES HANDS WITH MICHIGAN at dedication of Ambassador Bridge across Detroit River at Detroit. Charles McCrea (left), Minister of Mines for Ontario, and Fred W. Green, governor of Michigan.



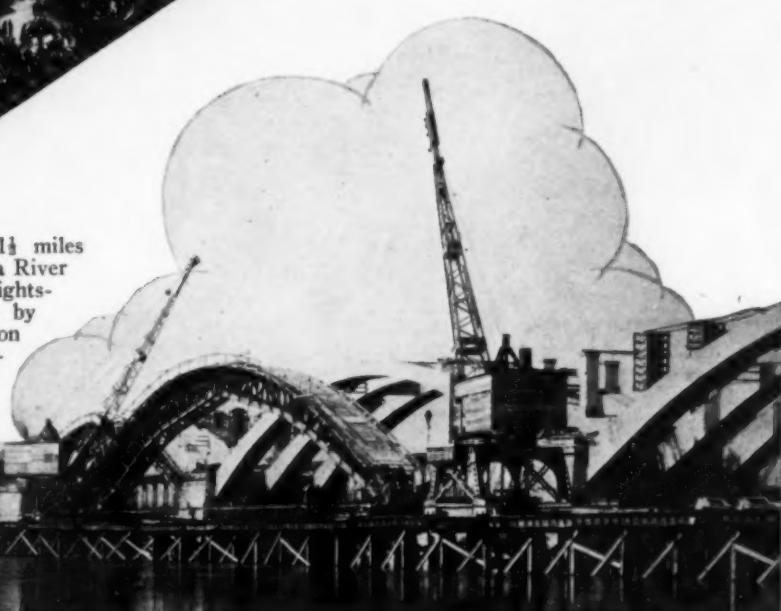
MERRITT HAVILAND SMITH MEMORIAL is unveiled at Kensico Dam of New York City water supply system, which Mr. Smith served in various positions for 40 years. From 1914 until his death in 1926, he was chief engineer of water supply.



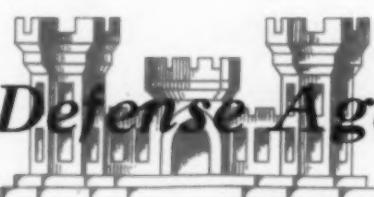
LAYING MASTER RING of first airship to be built in Goodyear-Zepelin Co.'s new airship factory. Erection of factory was depicted in *Construction Methods*, July, 1929, pp. 36-39.

HIGHWAY BRIDGE, 1½ miles long, crossing Susquehanna River between Columbia and Wrightsville, Pa., is being built by Wiley-Maxon Construction Co., Dayton, Ohio. January issue will describe construction of bridge.

AMBASSADOR BRIDGE, with 1,850-ft. main span across Detroit River, is completed 9 months ahead of schedule, despite delay caused by dismantling structure to replace cables. *Construction Methods*, Aug., 1929, pp. 46-50, contained article on dismantling of cables, as performed by Keystone State Corporation, cable sub-contractor. McClintic-Marshall Co., general contractor.



First of a Series of Articles on the \$325,000,000 Construction Program
for Flood Control in the Mississippi Valley



The Defense Against OLD MAN RIVER-I

BY ROBERT K. TOMLIN
Editor of Construction Methods

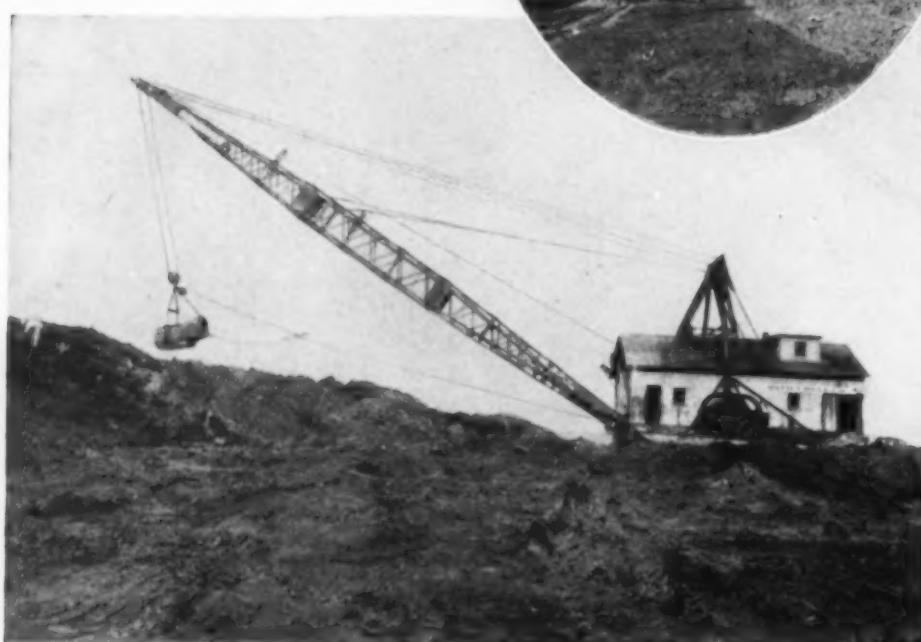
LEVEE building for flood control in the Mississippi Valley is passing through a period of transition from the mule-team and hand-labor methods of former generations of river contractors to a process already highly mechanized and one that promises soon to utilize in far larger measure than at present the varied mechanical equipment of today and the improved machines and methods of tomorrow.

That is the general impression gained from a month's trip down the 1,000-mile stretch of the Mississippi River between Cairo, Ill., and New Orleans. The mule is still a factor in levee building—let there be no mistake about that—and team outfits were observed on job after job along the waterfront, but the tractor-hauled wagon, the drag-line excavator, the industrial railway outfit, the hydraulic dredge, and the huge tower-cableway machine with its 6 or 8-yd. bucket are

crowding in upon him relentlessly and his future usefulness will, in all probability, be limited to such auxiliary services as slope-finishing and other comparatively light grading and haulage

operations. One thing is certain: From now on machines are to occupy the front line in the defense against "Old Man River."

New Problems—This transition from animals and hand-tools to modern machine methods for levee construction is the natural result of the new conditions that today's levee builder faces. Much of the work of the ten-year, \$325,000,000 Mississippi River flood control program approved by Congress in 1928, calls for wider and higher levees and contracts of larger yardage than heretofore. Whether the work be the enlargement of existing embank-



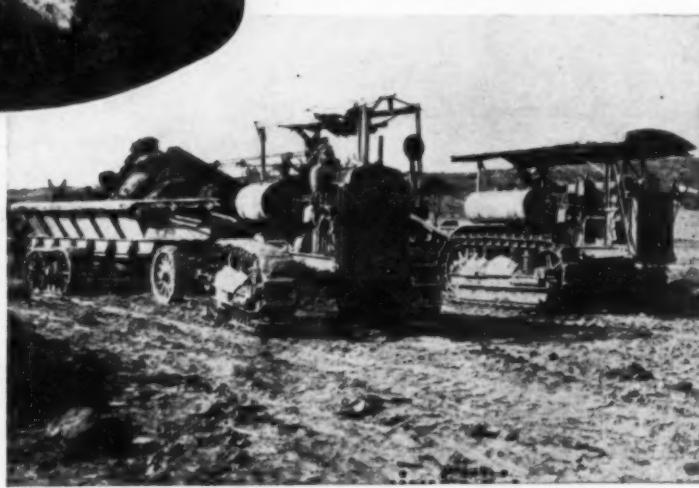
THREE TYPES OF MOUNTING provide mobility for heavy excavating and placing equipment on levee work. Double crawlers (*in oval*) support Government-owned Bucyrus tower-cableway machine. Walkers (*lower left*) carry Monighan dragline with 4-yd. bucket. Railway track (*lower right*) is laid for movement of long-boom Marion dragline.

ments—the major operation now in progress—or the construction of brand new loops, set-backs or other lines of defense against high water, the result for the constructor is the same: He must handle larger volumes of fill than he did formerly, he must build sections to greater heights and widths than before, he must speed up production to meet closer time limits on emergency work, and, especially in the case of enlargement of old levees for which borrow pits have already been depleted of material, he must go farther out from the toe of the section to secure his fill. These requirements, of course, impose upon the levee-builder conditions of much longer haulage than he had to cope with in the old days and open up opportunities for large-scale machine operations.



along the line that this year's flood control operations are serving as a gigantic proving ground for determining how best to adapt present-day machines to the task in hand, what combinations and sizes of equipment will prove most effective on the Mississippi River work, and what new devices can be evolved to increase output, save time and cut costs.

The magnitude of the work, the fact that Congress has placed it upon a long-time continuing basis and President Hoover's recent pronouncement of a definite, progressive national waterways policy combine to justify a considerable amount of field research, of cut-and-try-method, by the levee constructors as an essential prelude to the great new construction era which has opened up in the Mississippi Valley.



THE BIG PARADE! Caterpillar tractors lead steady march of Russell elevating graders loading into 7-yd. crawler-mounted Western and La Plant-Choate wagons. **SLOPE FINISHING** (at top), with wheel scraper. **BOGGED DOWN** (insert), indicating treacherous character of material on levee work.

In many of its aspects, therefore, today's levee-building program presents new construction problems demanding new solutions. That is why a trip down the river at this time discloses nothing even approaching standardization in method or uniformity in equipment. Variations in local conditions and material, of course, account to some degree for the diversity in the methods and the machines that the river contractors and the forces of the Corps of Engineers, U. S. Army, are using, but it is apparent all

LEVEE ENLARGEMENT with tower-cableway (below), showing old and new grades of side slopes for earth fill.



Diversity of Methods—Some idea of the diversity of method and equipment in use today for building new levees or enlarging old ones may be gained from the following list of plant set-ups observed along the river between Cairo and New Orleans:

- (1) Large walking dragline enlarging levee with single cast of material from borrow pit.
- (2) Two walking draglines, in tandem, one feeding the other from distant borrow pits beyond reach of single machine.
- (3) Light crawler dragline loading narrow-gage side-dump railway cars hauled by industrial gasoline locomotive.
- (4) Steam shovel load-

ing standard-gage side-dump cars hauled by steam locomotive. (Special work in connection with a railway embankment).

(5) Light dragline loading train of industrial cars dumping from track loop into pit at toe of levee for rehandling to place by second dragline.

(6) Tower cableway machines with 6 and 8-cu.yd. buckets and spans between head and tail towers of 650 ft. or more.

(7) Light crawler dragline loading tractor-hauled trailer wagons equipped with crawler treads.

LOADING a Linn tractor (*right*) with crawler-mounted P&H dragline



A PAIR of 5-yd. Western wagons loaded by a Northwest dragline and hauled to levee by Monarch tractor.

(8) Light dragline loading mule-team wagons on wheels.

(9) Light dragline loading motor truck equipped with wheels on front end and crawler tracks on rear end.

(10) Hydraulic dredge pumping directly into levee section.

(11) Hydraulic dredge pumping material into old borrow pit for rehandling into levee by tower-cableway machine.

(12) Dredge boat with 6-yd. California type clamshell bucket on 240-ft. boom.

(13) Elevating grader, with power take-off, loading tractor-hauled wagons on crawlers.

(14) Elevating grader, with power take-off, loading mule-team wagons on wheels.

(15) Special electrically operated fresno scraper with 16-cu.yd. telescoping compartment body, hauled by 100-hp. tractor.

Novelties in Equipment—In addition to the foregoing equipment something entirely new in mechanical plant for levee building is being installed on a 4,500,000-cu.yd. contract below Vicks-

burg. At this writing details are not available, but the equipment, if rumor is to be credited, involves the general principle of a huge belt conveyor mounted on a barge and fed by some scraper device. Considerable secrecy shrouded this installation. Levee builders up and down the river referred to it as "the mystery plant."

Other outstanding developments in heavy mechanical equipment will be forthcoming on the big contracts recently awarded for the long control levees in the Bird's Point—New Madrid floodway on the Missouri side

of the river, southwest of Cairo. Equipment of immense size (150-ft. dragline booms) and great power is being erected in this area, but it is still too early for operating details.

Something unique, also, is promised, if present plans mature, in the form of a pair of 20-yd. wagons, on crawlers, to be loaded by dragline and pulled up and dumped on the embankment by a wire cable and mast rig, one wagon, loaded, moving forward while the other, empty, returns to the borrow pit.

Diesel engine power is making decided headway in connection with dragline and dredging operations, while Diesel-electric installations, among them a large dragline, have been made on mobile excavating equipment. Looking ahead, one engineer with a long and varied background of experience on river work sees possibilities for all-electric machines for levee building, provided power lines can be brought within reasonable distance of the jobs now located, in many instances, in places difficult of access and without such service facilities. With the all-electric machine, of course, there develops the problem of movement from job to job, although in the absence of near-by electric power lines to tap, independent Diesel-electric power plants on crawlers or other types of mobile mounting have been suggested to serve the all-electric machines without pro-

LOOP RAILWAY.
Plymouth loco hauls
Western side-dump cars
from borrow pit to P&H
dragline at levee



ducing a self-contained unit of excessive weight.

Dredging, too, is among the newer methods of levee building that several contractors are using. Under the

day's levee building offers a variety of new problems, some of the old ones are present with a vengeance. Chief among these are the vagaries of the river itself, with its quickly changing

pellet-shaped ("buckshot") pieces. Wet buckshot, however, forms the stickiest, most slippery mud that ever defied the efforts of a dragline bucket. When placed on the levee fill in a saturated condition it becomes a self-lubricator and promptly slides down to the toe of the slope—"beats the bucket back to the borrow pit" is the way one dragline operator described its antics.

Keeping the borrow pit dry by drainage ditches (for river seepage



ELECTRICALLY-OPERATED 16-cu.yd. Fresno scraper, with series of four telescopic buckets and sliding tail-gate, hauled by 100-hp. Cletrac.

right conditions and with the proper material to work with the dredge undoubtedly has a distinct field of usefulness on the Mississippi flood control work. Levee contractors of the old school, however, refer skeptically to the hydraulic dredges as "squirters," but some of them were frank in confessing that the advent of these machines on levee work this year caused a general lowering of bid prices at some of the early contract lettings. Two types of dredge are now operating on levee work. One is the regular hydraulic unit pumping directly into the levee section where the material is retained in a long pool created by earth dikes. This method requires an auxiliary dragline machine to top off the section (after the material has dried out sufficiently for handling by a bucket) and to bring the embankment slopes to the proper line and grade. The other type of dredge in use is the so-called California type with a 6-yd. clamshell bucket operated from a huge boom, 240-ft. long.

Construction Difficulties—While to-

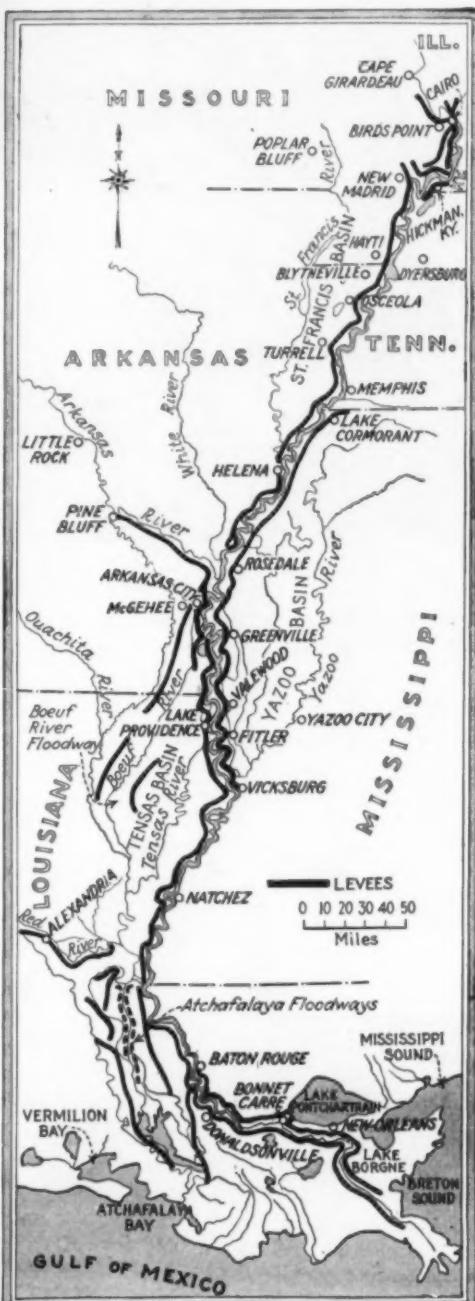
moods of docility and swollen violence. Today's weather man is no kinder toward the contractor than of yore. Rain is always a factor to be reckoned with, to say nothing of seepage into the borrow pits from the river during high-water stages. These two enemies of uniform construction progress, either singly or in combination, may keep borrow pits flooded for protracted periods and require elaborate and costly drainage operations.

Last, but by no means least, is the character of the Mississippi Valley soil—sand, silt, loam or buckshot clay in various combinations. When dry, these materials are readily handled. When wet, with the exception of the sand, they seem to the earth mover to be possessed of a diabolical perversity, the silt and loam forming a semi-liquid ooze impossible to handle. The buckshot clay, however, is the veritable Dr. Jekyll and Mr. Hyde among levee-building materials. Dry, it becomes a hard-baked, impervious material forming an excellent embankment; a lump of it, when kicked, breaks up into



SPECIAL CONDITIONS, involving combined levee and railway embankment, called for Bucyrus steam shovel and standard-gage Western side-dump cars.

CONSTRUCTION METHODS—December, 1929



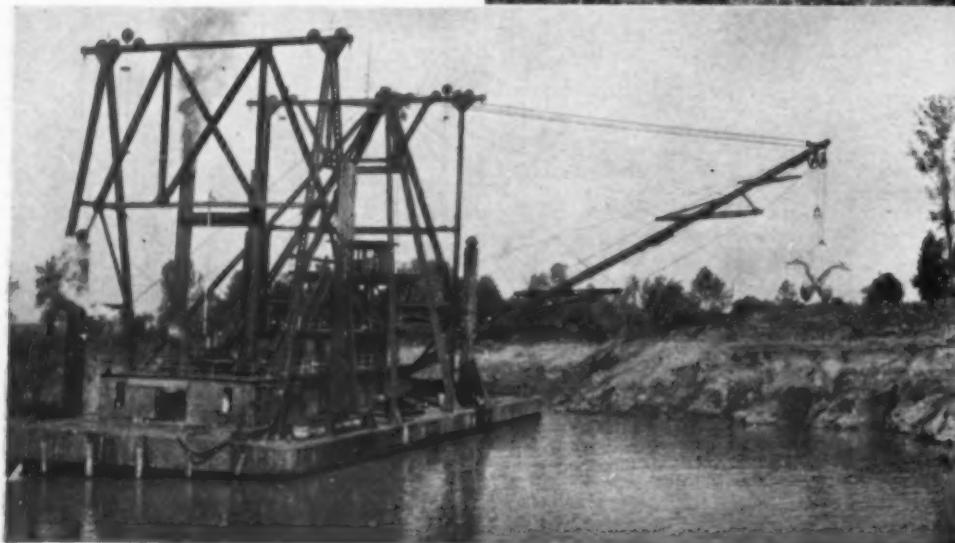
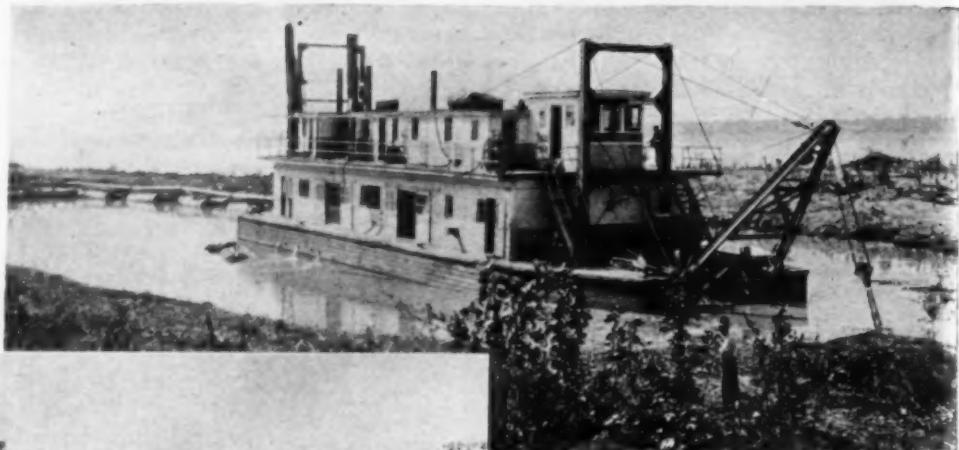
A PORTRAIT of "Old Man River," showing lines of main levees for Mississippi flood control between Cairo, Ill., and New Orleans.

and rain water) and by temporary embankments to check inflows of water during rises in the river, becomes one of the levee-builder's major problems. With a wet borrow pit, work stops.

Other Works—Levee building and

enlargement, of course, is the major item in the construction program now under way in the Mississippi Valley. Two other types of work, however, are active. The first of these is the making and placing of revetments (both of concrete and willow mats) to pro-

DREDGES of two types. (At right) Hydraulic unit and (below) California type with 6-yd. clamshell bucket on 240-ft. boom.



tect the banks of the stream both above and below the water line from the cutting and caving action of the swift

work, the conditions under which construction is proceeding, requirements of contract and specifications and the methods and the equipment that have been mobilized and placed in service to roll up the low-lying delta lands into sturdy earthen breastworks to turn back Old Man River when he starts to run amuck.



QUARTERBOAT (above) housing Government workers who operate floating concrete plant (right) for paving bank slopes.

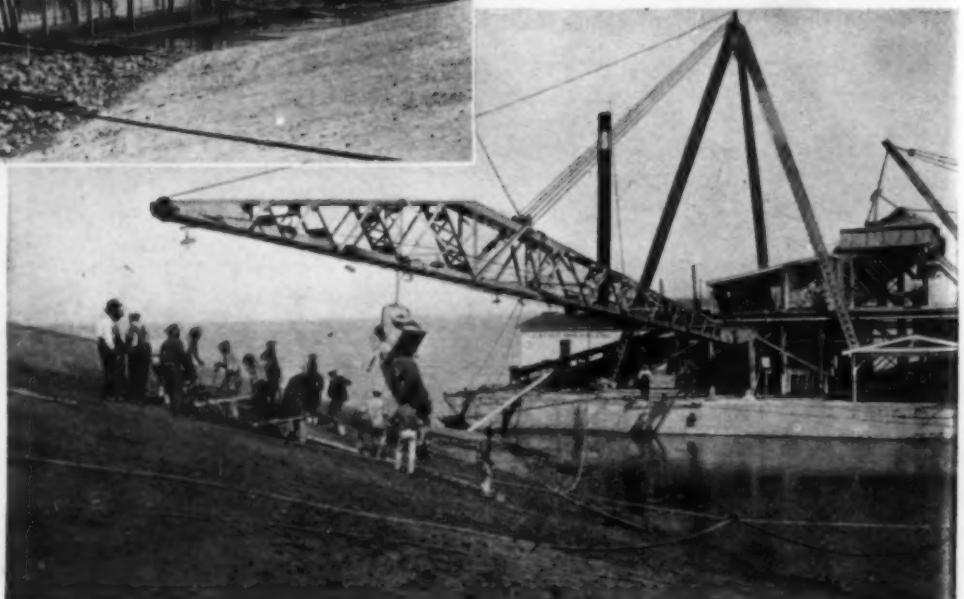
river current. The second is the construction of dikes, cribs and other channel control works, in addition to channel maintenance by dredging.

* * *

So much, then, for the general view of the Mississippi flood control construction picture. Let us now approach closer and examine some of its details—the organization that is handling the

Organization—All flood control work in the Mississippi Valley is being done by or under the supervision of the Corps of Engineers, United States Army, headed by Major-General Lytle Brown, Chief of Engineers. Most of the levee building now in progress is by contract, although the Engineer Department of the Army is a competitive bidder with the contractors on every job and is handling a substantial program of construction with its own forces and equipment. Revetment work, involving elaborate and costly floating plant, is done exclusively with Government forces and equipment.

The execution of the field work in the area covered by this series of articles (from Cairo, Ill. to New Orleans) is decentralized among three districts, constituting the newly created Lower Mississippi River Division of the army engineer organization, with Brig.-Gen. Thomas H. Jackson, Corps of Engineers, U.S.A., in charge as division engineer, with headquarters at Vicksburg, Miss. Each of the three district organizations in turn is subdivided into "areas," headed by an area engineer as follows:





HYDRAULIC MONITORS are one of the methods used to grade river bank for concrete revetment.

MEMPHIS DISTRICT
District Engineer: Lieut.-Col. F. B. Wilby.

Area Engineers: T. T. Knappen, Cairo; Major E. C. Kelton, Memphis; H. V. Pittman, Helena, Ark.; Major L. D. Worsham (tributaries), Memphis.

VICKSBURG DISTRICT
District Engineer: Major John C. H. Lee.

Area Engineers: E. S. Maupin, Rosedale, Miss.; W. L. Lipscomb, McGehee, Ark.; Lieut. M. W. Gilland, Greenville, Miss.; C. J. Rhodes, Lake Providence, La.; K. R. Young, Monroe, La.; W. M. Childs, Vicksburg shops.

NEW ORLEANS RIVER DISTRICT
District Engineer: Major W. H. Holcombe.

Area Engineers: D. L. White, Natchez, Miss.; W. A. Wells, New Orleans; Harry Pockras, Atchafalaya River; Capt. Helmer Swenholz, New Orleans.

Under the district engineers the area engineers are the men having immediate supervision over all construction work in their territories, whether that work be by contract or by day labor with Government personnel and equipment. Under

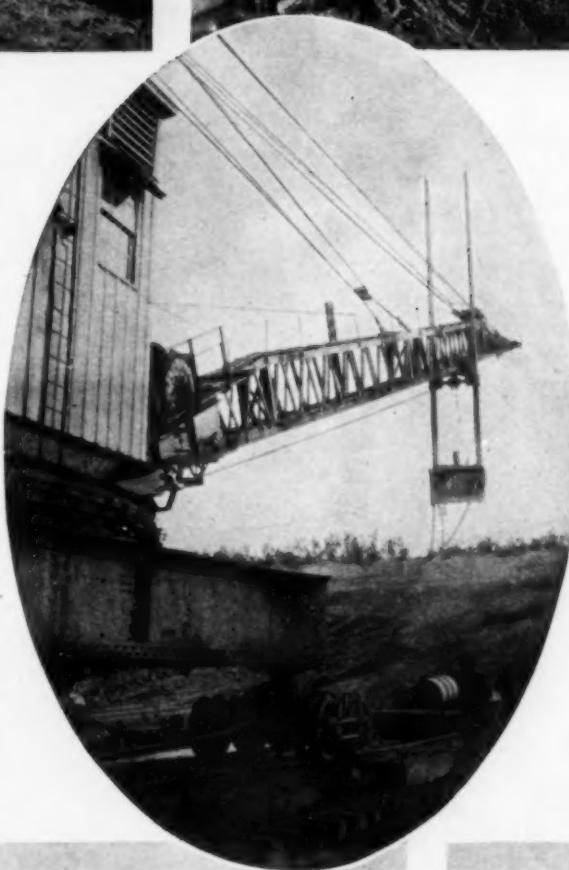


CHANNEL CONTROL by the construction of permeable crib dikes of freshly cut trees.

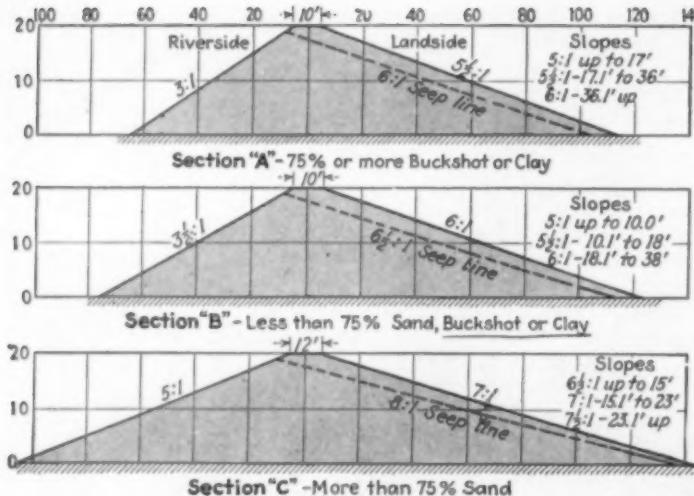
each area engineer is a corps of engineering assistants, inspectors, superintendents, foremen, machine operators, mechanics and common laborers.

Contract Requirements — The contract requirements of the levee work, in addition to the clauses common on other types of construction, include the following: The 8-hour day is not obligatory. The common practice of operating with two 10-hour shifts per day is described by the colored laborers as "working from 'can' to 'can't'" — from dawn, when they can see, until dusk, when they can't see.

The unit price bid includes clearing, preparation of levee foundations, grubbing, dressing, sodding slopes, fencing, drainage, timber felling and removal of debris. In



WILLOW MAT REVETMENT, showing timber framed type (*left*) under construction and woven fascine type (*right*) before sinking. (*In oval*) Bank grading for revetment with special blade on Bucyrus dragline boom.



STANDARD LEVEE SECTIONS, indicating variations in assumed line of water seepage and side slopes, depending on character of material and height of fill.

erally must not be steeper than 1 on 2 down to a depth of 3 ft.; from that point outward the pit may be deepened at a slope of 1 on 50 when on the river side and 1 on 100 when on the land side.

In the New Orleans River District different borrow pit specifications apply. Here river-side pits may approach to within 20 ft. and land-side pits to



REVETMENT of 6x11-ft. rigid concrete slabs are cast at floating plant (*in oval*) and sunk from specially equipped barges (*below*) to form "shingled roof" protection of river bank and bottom.



comparing the competing bids of the U. S. Engineer Department and the contractors for levee building work the practice is to add to the engineers' estimate of cost 25 per cent for overhead and other general charges and to the contractor's bid an amount varying between about 4 and 7 per cent to cover expense of supervision and inspection. On this basis the award is made to the low bidder, with the contractor usually receiving the preference if the prices are practically the same.

For fill made by machine there is no requirement as to deposition in layers; for embankment made by wagon, scraper or wheelbarrow methods, however, placement in 3-ft. layers is called for.

Unless specified, no material for levee building or enlargement may be taken from the *land* side of the embankment. The almost universal practice is to obtain fill from the *river* side.

Borrow Pits—In the Memphis and Vicksburg districts, which include the delta lands of the Mississippi as far south as its junction with the Red River near the Mississippi-Louisiana state line, no borrow pit material may be obtained within 40 ft. of the toe of the levee on the river side, nor within 100 ft. on the land side. This "No Man's Land" between edge of borrow pit and toe of levee is known as the *berm*.

As for the borrow pits themselves, their side slopes nearest the levee gen-

within 80 ft. of the levee base, for levees 20 ft. or less in height. Riverside berms of 40 ft., however, are specified for levees exceeding a 20-ft. height. Starting, nearest the levee, with a 1 on 2 slope to a depth of 3 ft., the bottoms of borrow pits in this district may be deepened at a slope of 1 on 10 on the river side or 1 on 100 on the land side.

It is apparent, therefore, that contractors and government forces in the Memphis and Vicksburg districts must make shallower and longer cuts to secure their borrow pit material than is the case further down the river in the New Orleans district, where comparatively deep cuts from borrow pits closer to the levee toe are permissible.

Levee Cross-Sections—For levees in the Memphis and Vicksburg districts three different cross-sections, A, B, and C are being used, depending upon the character of material obtainable for fill. The side slopes of the three sections have been designed so that the line of water seepage through the earth fill, starting at a point 1 ft. below the

bottom of the net section, will remain within the levee section right down to the toe of the embankment on the land side. The slopes of these seep lines have been fixed as follows for the three general classifications of material of which levees are built: (1) 1 on 6 for material containing 75 per cent or more of buckshot or clay; (2) 1 on 6½ for less than 75 per cent of sand, buckshot or clay; and (3) 1 on 8 for more than 75 per cent of sand.

The foregoing seep line requirements produce levee cross sections (depending on height of levee), as shown in the drawing on the opposite page.

Shrinkage—For the contractor an important feature of levee construc-

tion is the material in excess of the net section required to be placed in the embankment to compensate for shrinkage. Payment, however, is made only for the *net* section.

Different shrinkage requirements are specified, depending upon the method and the equipment the contractor uses in making the earth fill. If he delivers his material with a hydraulic dredge he need place no fill in excess of the specified levee section. If he uses scrapers, or tractors and wagons, he must build his levee 15 per cent larger than the specified *net* section. For animal and wagon work he must build to a height and width 20 per cent greater than the net lines. For other methods, including dragline and other machine scrapers, regardless of the material used, he must put 25 per cent excess yardage in the section.

For dragline work, therefore, this means that a contractor with a contract calling, let us say, for 1,000,000 cu.yd. of material in the completed fill, must actually place 1,250,000 cu.yd. to compensate for the 25-per cent allowance for shrinkage and settling. He is paid, at the unit price of his bid, for the 1,000,000 yd. of the *net* levee section.

NEXT MONTH: Details of method and equipment for Mississippi levee construction.



levee crest, will remain within the levee section right down to the toe of the embankment on the land side. The slopes of these seep lines have been fixed as follows for the three general classifications of material of which levees are built: (1) 1 on 6 for material containing 75 per cent or more of buckshot or clay; (2) 1 on 6½ for less than 75 per cent of sand, buckshot or clay; and (3) 1 on 8 for more than 75 per cent of sand.

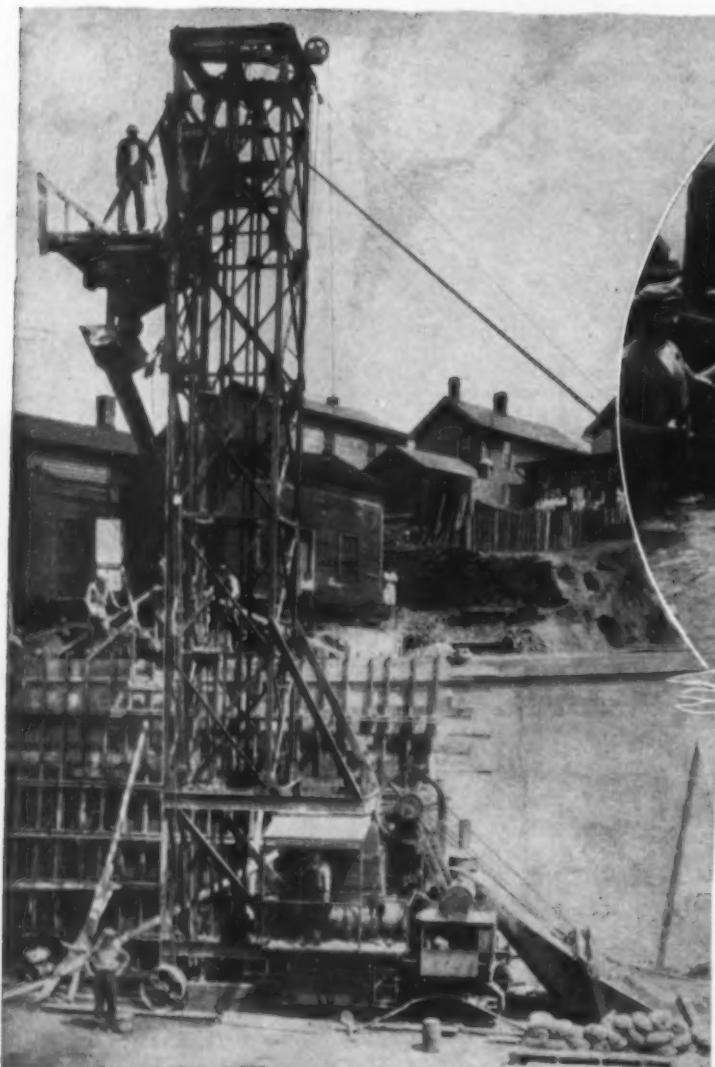
The foregoing seep line requirements produce levee cross sections (depending on height of levee), as shown in the drawing on the opposite page.

Shrinkage—For the contractor an important feature of levee construc-

ANOTHER TYPE of revetment. Articulated concrete mats are cast (in oval, top) in 25x4-ft. strips and sunk as huge flexible sheets from barge with roller bearing launching ways. Individual mat sections (in oval, bottom) are used on bank above water line.

Getting Down to DETAILS

Close-up Shots
of Job
Methods and
Equipment



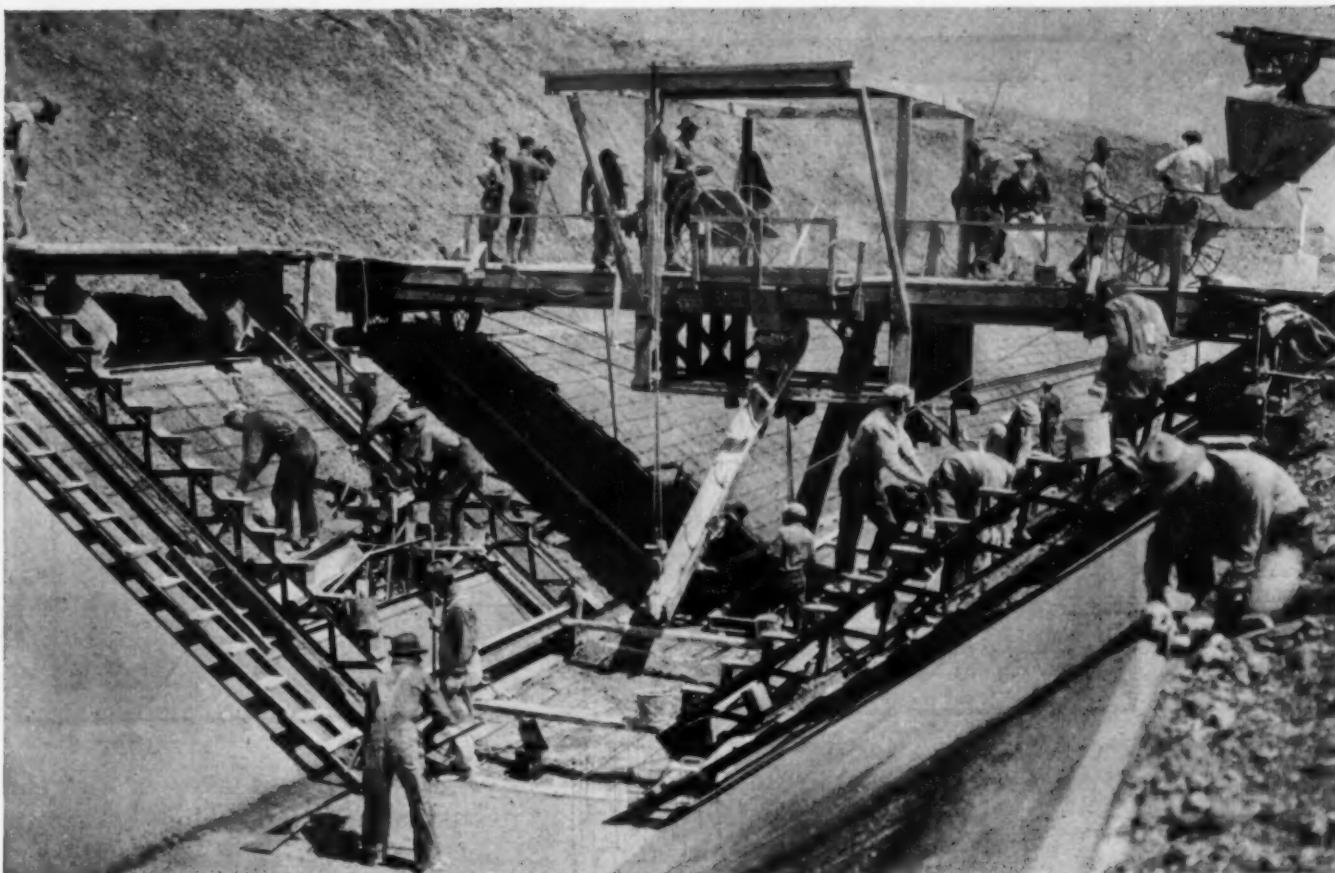
PAVER-TOWER UNIT (*left*)
of T. L. Smith Co. enables
H. E. Culbertson Co., Cleve-
land, to pour 1,400-ft. retaining
wall, containing 7,000 yd., in 2
months.



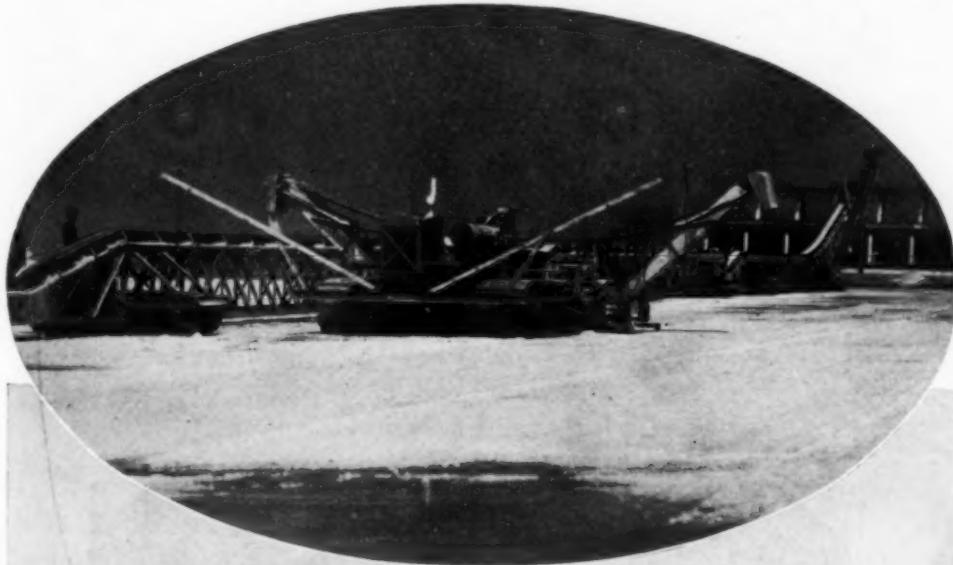
TO CUT PILES 2 to 4 ft.
under water without use of
divers, Great Lakes Dredge
& Dock Co. devised this
frame to which Wolf air-
driven saw is attached.



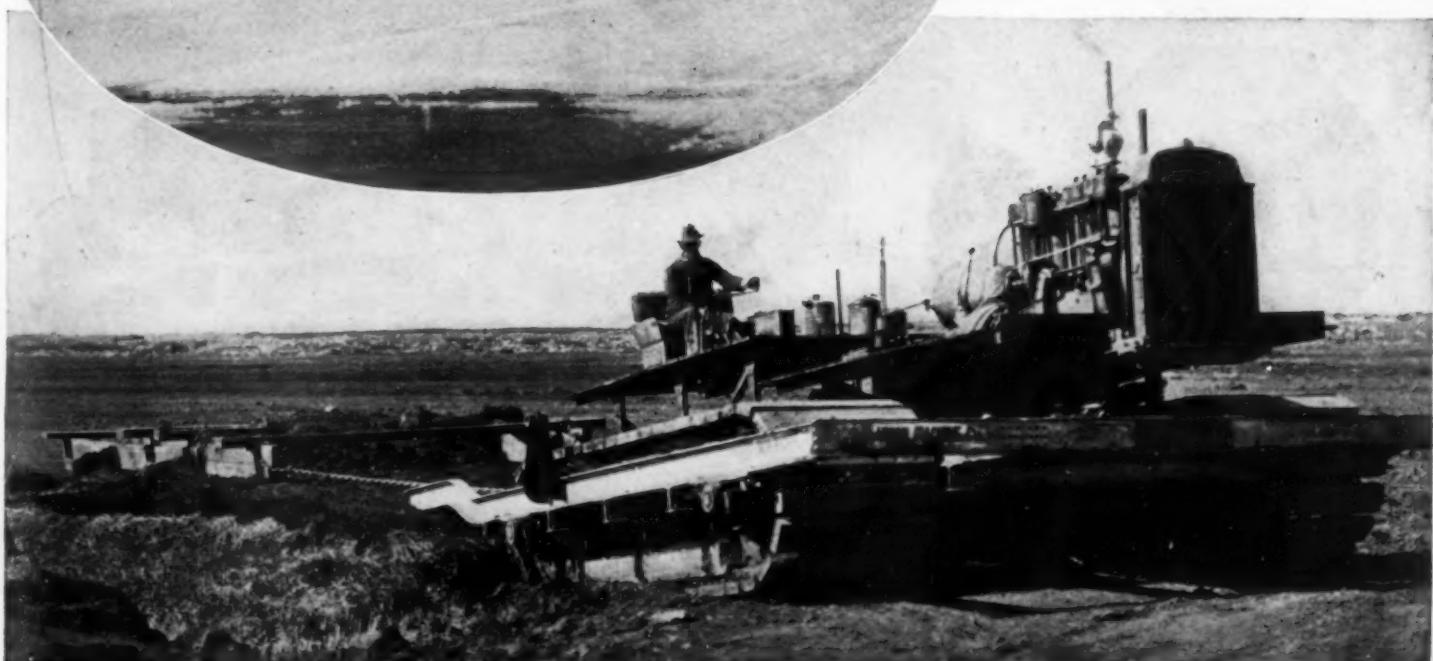
SUSPENDED SCAFFOLDING, hung from Macomber nailer joist purlins, permits concreting of floor to proceed
while lathers apply metal lath to ceiling rafters and cover metal lath base with plaster. After plastering is finished,
wires are pulled through ceiling, and holes are filled. Curtiss airplane hangar, Memphis, Tenn.



TRAVELING BRIDGE AND MOBILE SIDE SLOPE FORMS facilitate lining of canals on Bureau of Reclamation's Yakima Project, Wash. Mixer moves along canal bank. Three men on platform of side slope device tamp concrete under form panel.

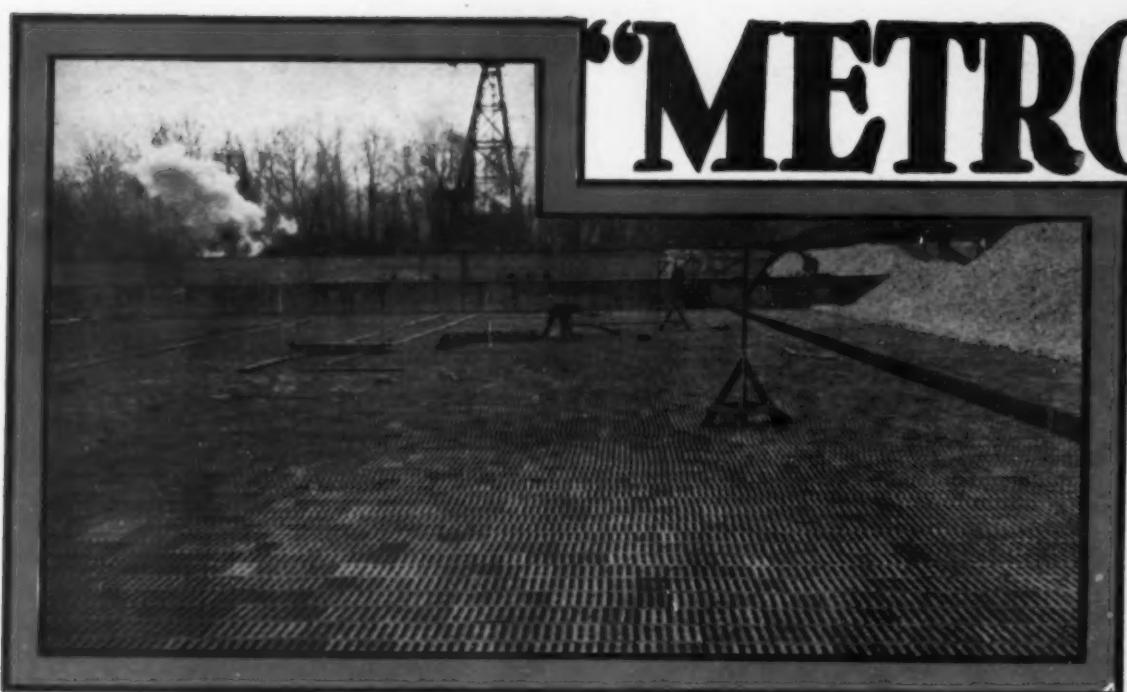


SALT FARM of Alviso Salt Co., at lower end of San Francisco Bay, uses Caterpillar tractors with broad crawlers to prepare ground before flooding and to harvest salt after evaporation. A 10-ton tractor with wooden treads 4 ft. wide and 13 ft. long drags surface of ground (below) and, equipped with rotary digger and endless belt driven by power take-off, tears hard layer off salt bed (left) and deposits salt on portable conveyor system.



4 ft.
edge
this
air-
ed.

"METRO"



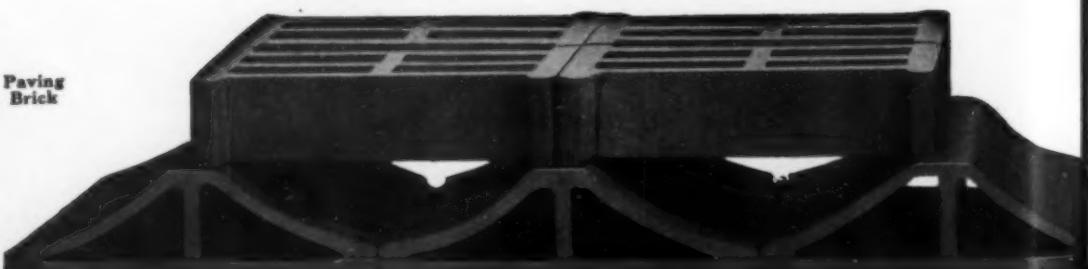
Face
Brick



Structural
Clay Tile



Paving
Brick



The Metropolitan

"offers real Economy

- in Construction
- in Longer Service
- in Lower Maintenance

THERE'S economy for the contractor who uses Metro—no shaping of floors necessary between drains—under drain covers entire floor and is easy to lay.

"Metro" Filter Block is not subject to action of sewage and will last indefinitely. Grill block has opening equal to that of voids in filtering media—will not clog.

There are no dead areas between drains and ease of access is afforded for inspection and flushing. Require practically no attention, reducing maintenance to minimum.

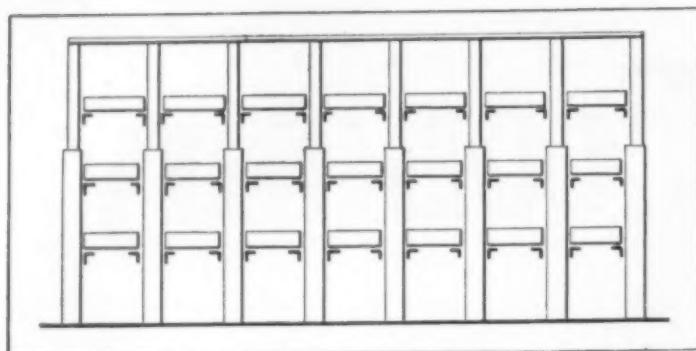
Strength, durability and low maintenance are essentials that are of interest both to the sanitary engineer and the community—they are also advantages found in "Metro" Filter Flooring.

*Get the facts.
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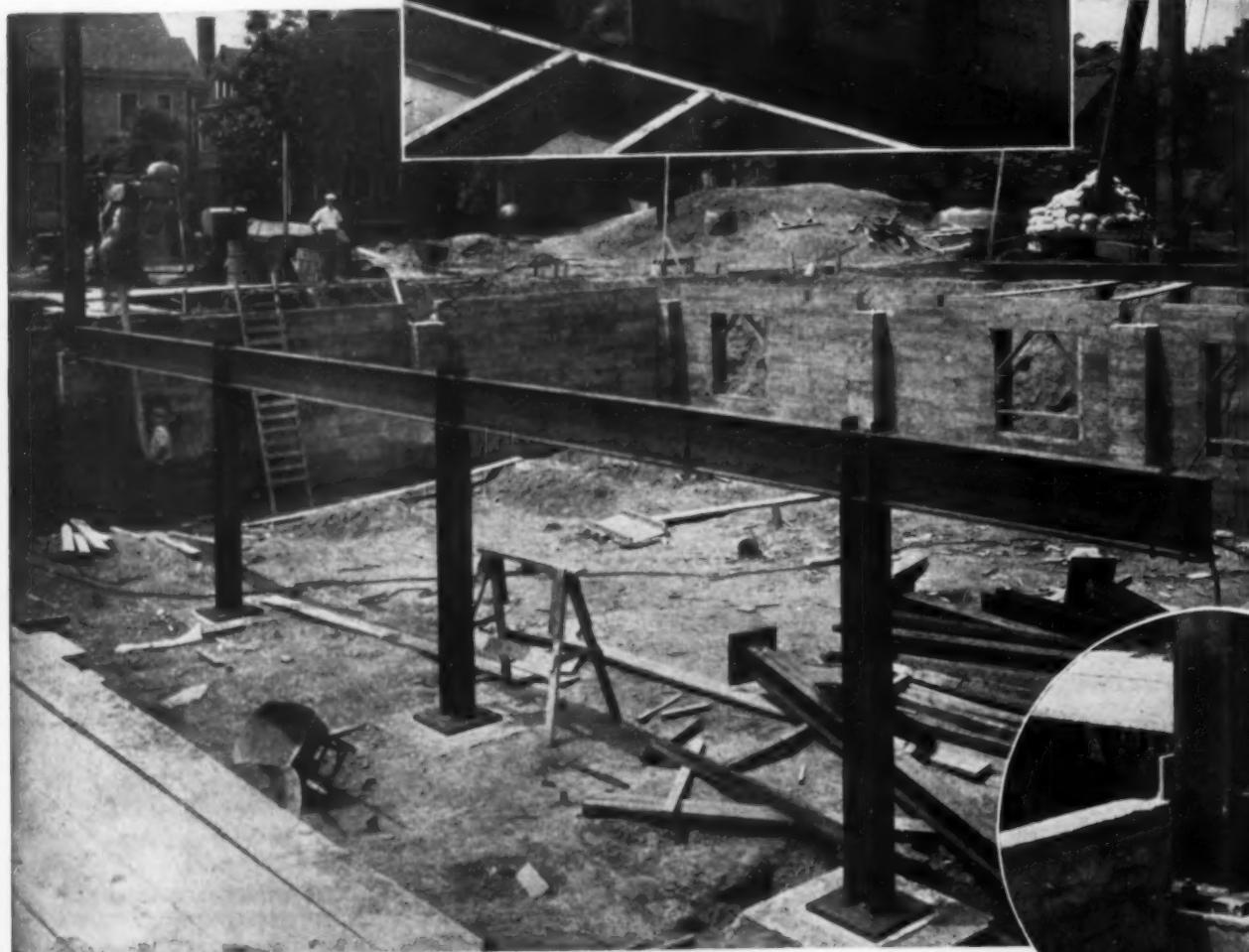
In Paving Brick Co., CANTON, OHIO

Step-by-Step Erecting an All-Welded Building



MULTI-STORY COLUMN CONSTRUCTION, as usually employed for riveted connections, requires an excess of steel in upper portion of columns, which are designed to carry load of lowest floor.

1 STIFFENER PLATES (right) are welded between flanges of continuous beams at column connection to carry lines of column flanges through beams. Angles and blocks welded to tops and bottoms of beams locate flanges and webs of columns.



2 HALF OF FIRST FLOOR CONTINUOUS BEAM is erected on basement columns. Angles and blocks on bottom of beam locate position of columns and act to steady them previous to shoring and welding. Beam is erected in two sections, each about 60 ft. long, butt welded together to make a continuous beam. Exterior columns resting on wall footings at ends of first floor beam are erected with basement columns before beam sections are placed.

3 END OF FIRST FLOOR CONTINUOUS BEAM bears on base plate of exterior column. This column, therefore, must be set before beam is erected.

Field Methods

USE of a completely welded design with continuous beams instead of the usual riveted multi-story column construction on a four-story store and office building, 60x119 ft. in plan, recently erected in Cleveland, saved approximately 15 per cent in the weight of the structural steel frame. The design allowed a reduction in size of both beams and columns and gave opportunity for the development of novel methods in construction.

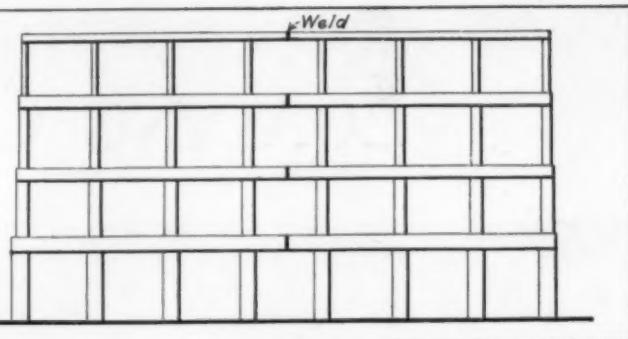
All fabrication was done in an outdoor yard of the Austin Co., Cleveland, owner and constructor of the building. The Lincoln Electric Co., which performed the welding work, used five Lincoln welding machines at this yard.

By milling tops and bottoms of columns and placing them between continuous beams, each column could be made the correct size and weight to

carry the load transmitted to it from the floor above. Stiffener plates carried the load through the continuous beams.

In joining the H-columns to their base plates, no connecting angles were required. The ends of the columns being milled, the columns were set upright on the base plates and were attached by welding a continuous bead along the outside edge of the column flanges.

As no bolts were used in erecting the structure, it was necessary to brace columns, until they were welded, by shores hooked to frames on the columns.



CONTINUOUS BEAM CONSTRUCTION, with single-story columns between beams, allows economical design of columns and reduction in size of beams.



4 BUTT WELDING (below) two beam sections to make one continuous beam. Plates, also, are welded across joint on top side of beam flanges.

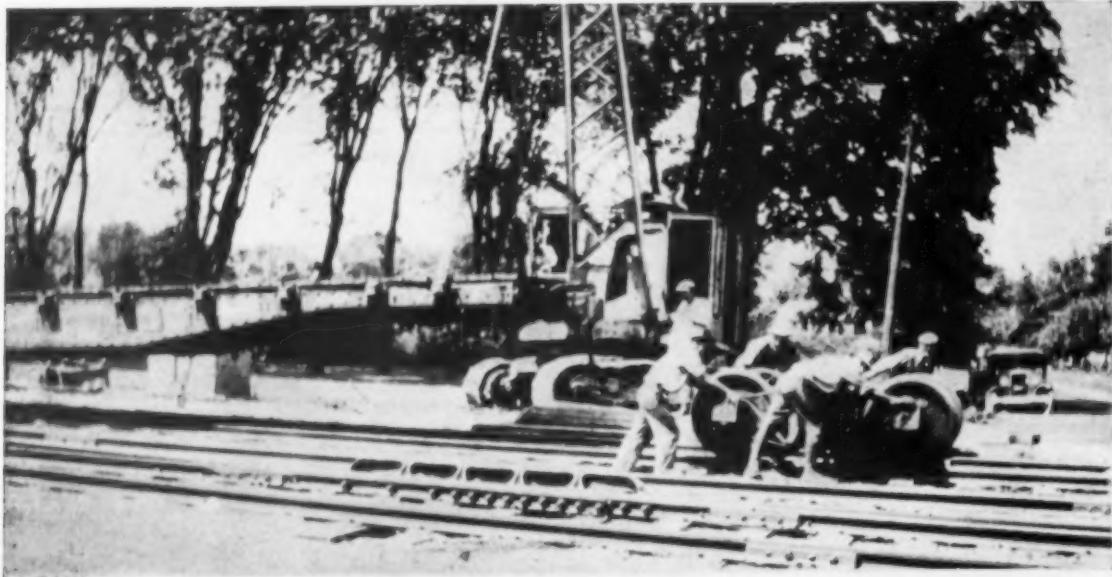


6 WELDED STRUCTURAL FRAME of continuous beam construction allows reduction in column size from floor to floor. Over store front, 36-in. Bethlehem girder is used to permit later widening of openings by removal of alternate columns, if desired. Bar joists for all floors are welded to their supporting beams.

5 FIRST OPERATION (above) in making connections is tack welding to hold members plumb; afterwards, a continuous bead is welded. Tops and bottoms of columns are milled to assure even bearing on beams.

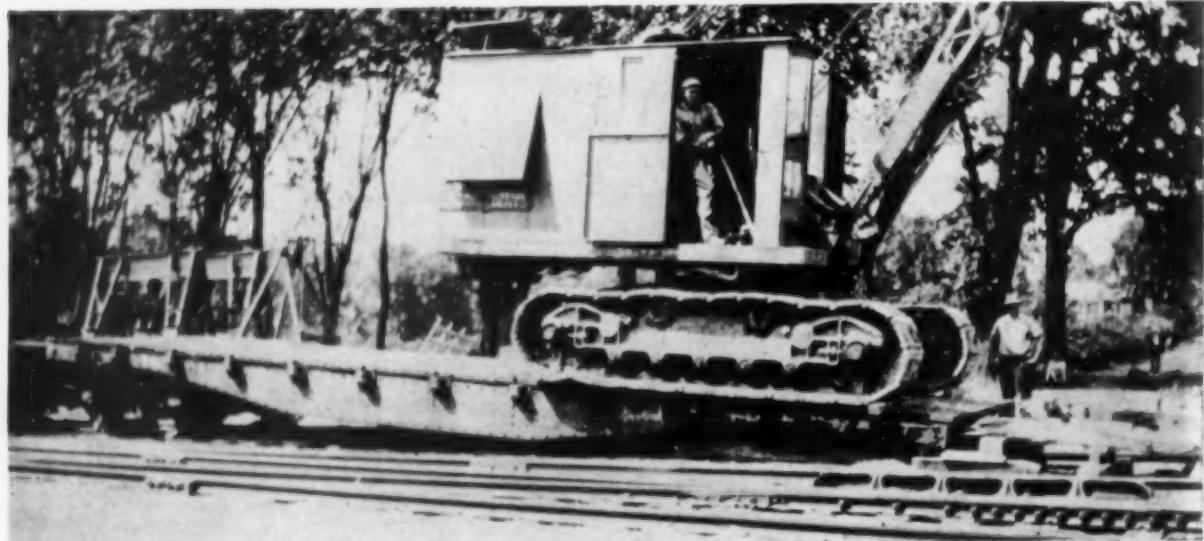
Step-by-Step Field Methods

LOADING CRANE ON FLAT CARS



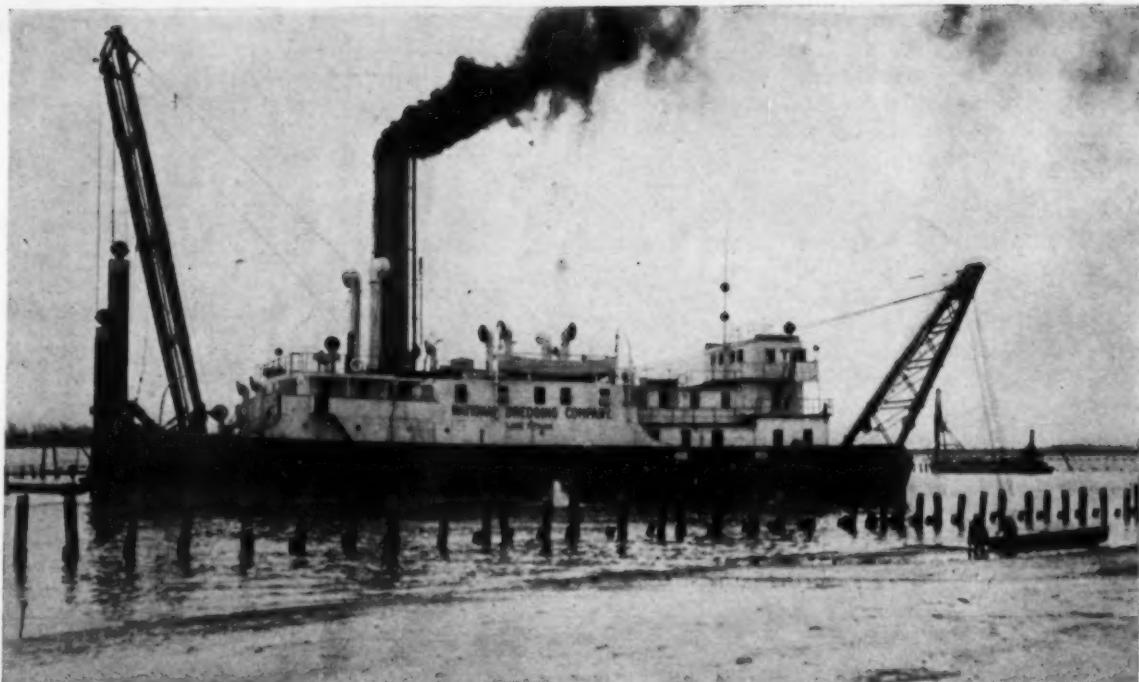
1 CRANE LIFTS ONE END of flat car, and workmen roll truck out from under car. Rail ties or other timbers then are laid beneath end of car, and crane lowers car until bolster rests on this timber blocking, with king pin centered between timber supports.

2 WITH ONE END OF CAR RESTING ON BLOCKING, runway of railroad ties or longer timbers is laid to edge of car deck, and crane travels over this runway on to car. By placing runway timbers even with car deck, all breakover at edge of deck is prevented. Crane travels to other end of car.



3 RESTING ON END OF DECK and on end of adjoining flat car, crane picks up lower end of car and places it on truck, after workmen have moved truck back to position under king pin. This method of loading can be reversed for unloading.

Photographs and Data
from
HAROLD TILLOTSON
*W. C. Meneely Co.,
Frankfort, Ind.*



HYDRAULIC DREDGE, "Lake Fithian," cuts coral rock to 35-ft. depth. Dredging of 6,900-ft. channel to depth of 35 ft. is later completed by bucket dredge, "Corozal."

DREDGES CUT 35-FT. HARBOR *in Florida's Lime Rock Coast*

CONSTRUCTION of the recently completed first unit of Port Everglades, a 35-ft. harbor between the cities of Hollywood and Fort Lauderdale on the east coast of Florida, involved the dredging of approximately 3,000,000 cu.yd. of rock and 1,500,000 cu.yd. of sand and the driving of 5,000 tons of steel sheet piles. Contract for the work was awarded to the Tropical Dredging & Construction Co., Hollywood, Fla., in February, 1927. Less than 30 months was required for the completion of this initial project.

Description of Project—The plan on p. 48 indicates the features included in the first contract. Portions completed to the 35-ft. depth are marked by the solid line. They comprise: an entrance channel 200 ft. wide and 6,900 ft. long, from 35-ft. ocean contour to turning basin; an entrance basin 14 acres in area; a turning basin 28 acres in area; and a slip 1,200 ft. long by 300 ft. wide. In addition to the dredging work, the initial program included construction of two breakwaters 4,200 ft. long, two jetties 800 ft. long, and steel sheet pile bulkheads

around the entrance basin and the slip.

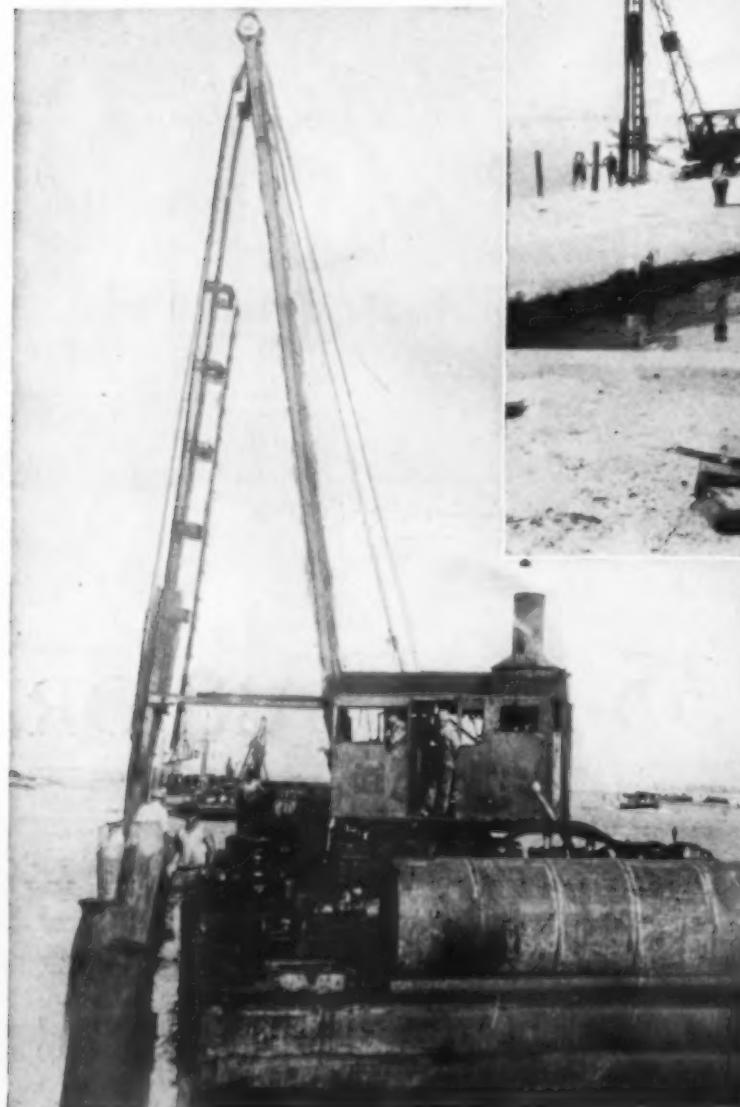
In the first year after the contract was awarded, dredges excavated 1,200,000 yd. of sand and 1,100,000 yd. of rock. Three suction dredges capable of excavating to depth of 18 ft. and a larger hydraulic dredge designed to cut to 25 ft. below water level completed dredging to the 18-ft. depth in this period.

Dredging Equipment—The 16-in. hydraulic dredge, "Dania," was typical of the smaller excavators. A direct-connected Fairbanks - Morse 360-hp.



DISCHARGE PIPE from hydraulic dredge places pumped material on jetty composed of limestone boulders.

Diesel engine drove the pump, and a 150-hp. Diesel engine-generator set supplied electric power to operate the other motions. The cutter was driven by a 110-hp. G.E. mill-type motor.



Steam power was used on the larger 20-in. hydraulic dredge, "General," which cut to 25-ft. depth. A 1,700-hp. triple-compound engine drove the pump, a 300-hp. double-compound operated the cutter, and a 200-hp. double-compound powered the swinging motion.

The "Lake Fithian," sea-going 20-in. hydraulic dredge of the National Dredging Co., was engaged by subcontract early in 1928 to dig 800,000 yd. of rock to the 35-ft. depth. This dredge, which since has been remodeled, was a converted lake-type Shipping Board vessel. Boilers, main engine, and auxiliaries were the original ship equipment. The 1,500-hp. main engine drove the pump, the maximum engine speed of 90 r.p.m. being stepped up through a 2½:1 gear ratio. A 100-ton ladder and heavy cutter were built for hard digging to a



ANCHOR PILES for slip walls are driven with swinging leads and steam hammer on crane boom. Floating piledriver supplies steam.

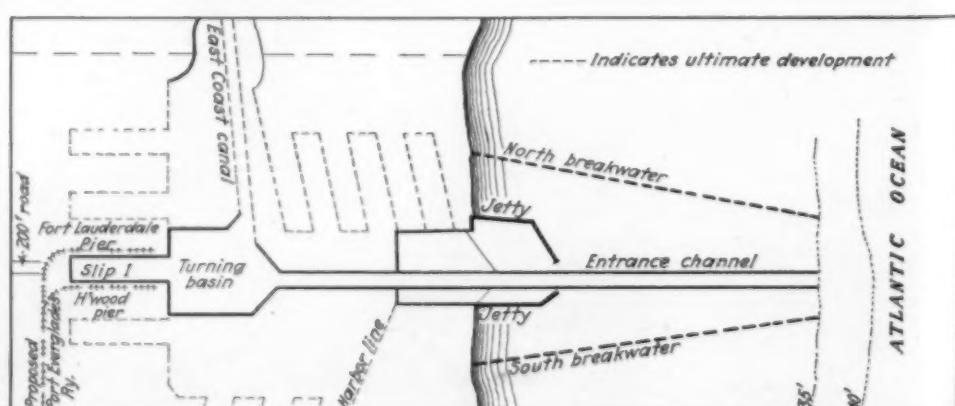
CRANE ON BARGE (left) drives piles in swinging leads.

ARTHUR N. SOLLEE (right), resident engineer for George B. Hills Co.



45-ft. depth. The cutter engine was 360 hp. and the swinging engine 140 hp. At the stern were two steel spuds 65 ft. long and 40 in. in diameter. The ladder-type dredge, "Corozal,"

of the Arundel Corporation, completed the channel excavation to the 35-ft. depth. Unusually hard, close-texture coquina was found in the ocean channel. This rock was placed as a



PLAN of Port Everglades, showing location of slips for future expansion. Relieving platform around slip, warehouse and railroad are to be started immediately.

mat on the breakwaters, where its use will effect a great saving in the cost of the ultimate construction.

The rock encountered in dredging the harbor was typical oölitic limestone. Four hard streaks about 250 ft. wide, running northeast and southwest, had to be surface-blasted before the smaller dredges could cut them.

Bulkheads and Slip Walls—Royce Kershaw, Inc., Jacksonville, Fla., drove the steel piles for the entrance basin bulkhead, and the Ebsary Foundation Co., Miami, Fla., drove all the piles for the slip walls. The latter contractor also placed the concrete cap walls covering the steel piling of the slip. This work was performed with floating equipment, one barge carrying the mixer, sand, and cement, and a second barge supplying enough rock for an 8-hour pour. Considerable expense and time were saved by chuting the concrete directly into the forms.

Only in extremely bad weather was the work interrupted.

At the time of placing the steel, the slip was only partially excavated to the 35-ft. depth, the greater portion being 25 ft. deep. To speed the work, the Ebsary Foundation Co. used a 70-ft. boom to place the piles, which were Lackawanna deep arch section in lengths from 39½ ft. to 49½ ft. In 25 ft. of water, an average of 39 piles was placed in a 9-hour day; in 35 ft., 43 piles were placed. At least 500 ft. of steel wall was set before driving to grade with a McKiernan-Terry 9-B-2 hammer. From 30 to 50 pieces of steel were driven each day to grade, depending upon the character of the underlying rock.

Wood piles to anchor the slip walls were driven later with the same size

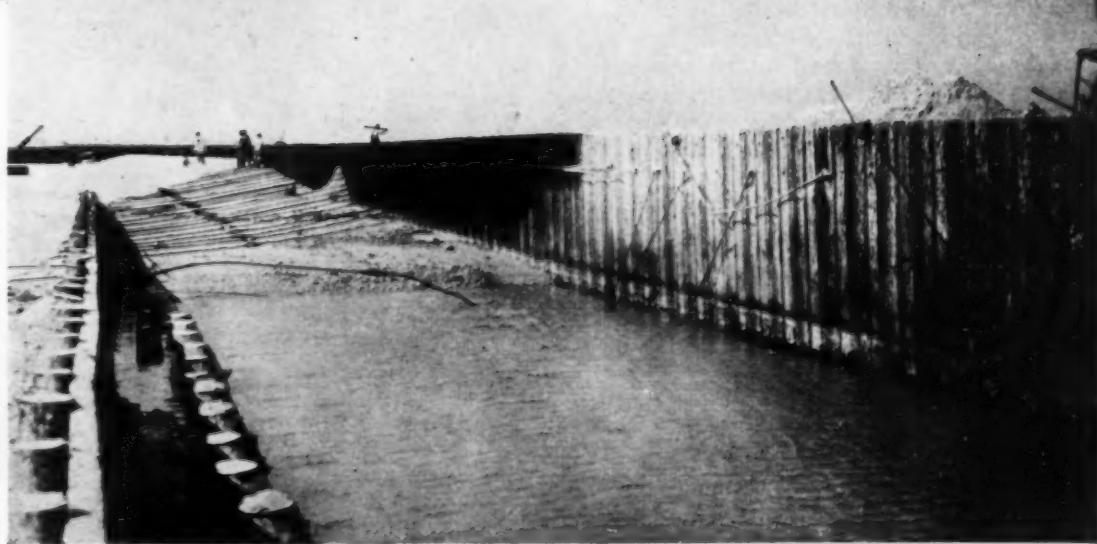
steam hammer hung in swinging leads, the leads and hammer being held in position by a Northwest crane. Steam was supplied from a floating piledriver through a 2-in. pipe and steam hose.

The 40,000 cu.yd. of coral rock boulders in the jetties and the 240,000 cu.yd. in the breakwaters were placed from barges. Dredged material was used to blanket these boulder dikes.

Port Everglades is being built by the Broward County Port Authority. The George B. Hills Co., Jacksonville, Fla., is directing construction of the harbor, which was designed by Col. E. N. Johnston. Arthur N. Sollee, resident engineer, supervises operations for the George B. Hills Co. Mr. Sollee provided much of the material included in this description of the work.

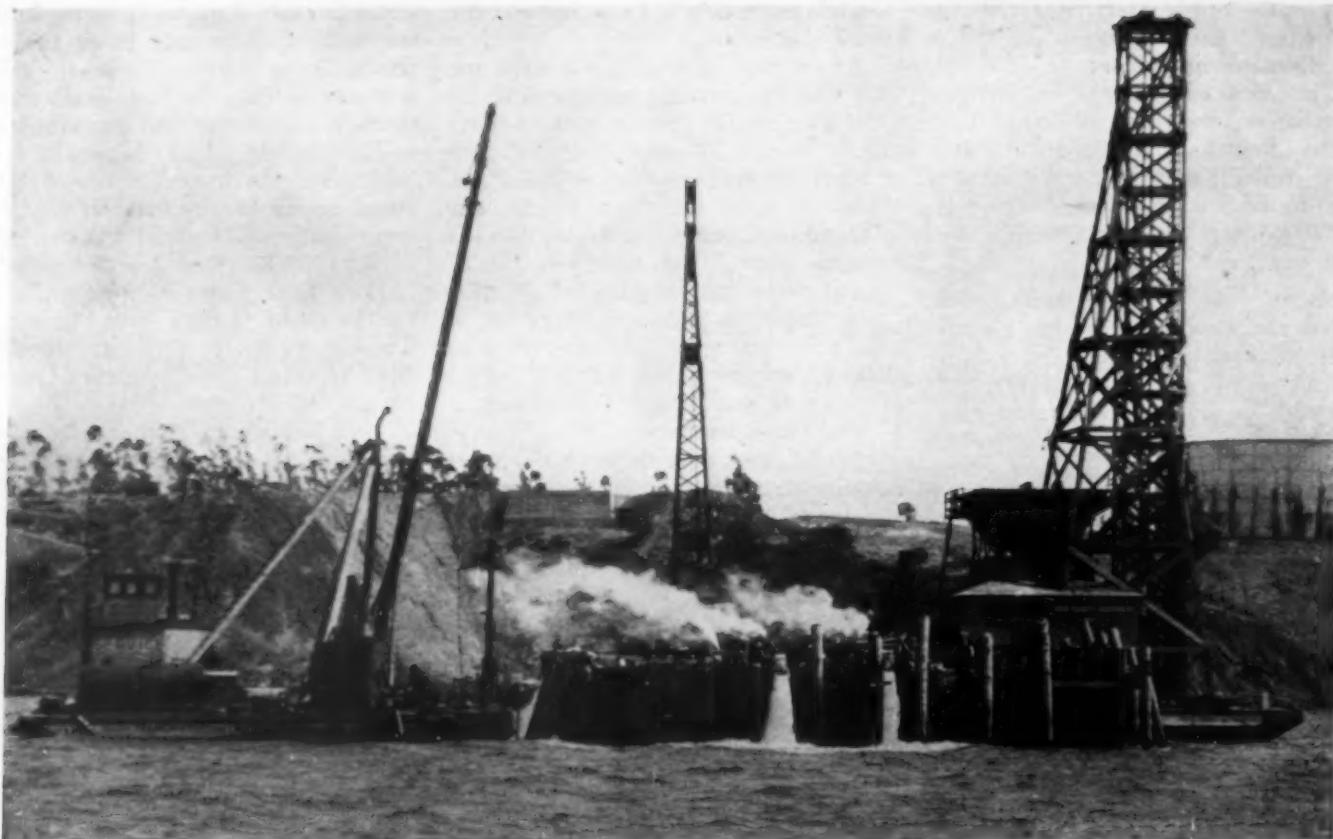


HARD COQUINA is chuted from bucket dredge to barge. This rock is placed on breakwaters to form mat.



CONCRETE CAP and timber wale (above, right) of slip wall, prior to driving of fender piles. Relieving platform is placed behind this wall.

BULKHEAD WALLS at entrance basin are tied to wood anchor piles. Hydraulic dredges pump fill behind these walls.



PUMPING OUT COFFERDAM against a 58-ft. head. Floating concrete plant is moored on other side of coffer. Bridge abutment appears on bank in background.

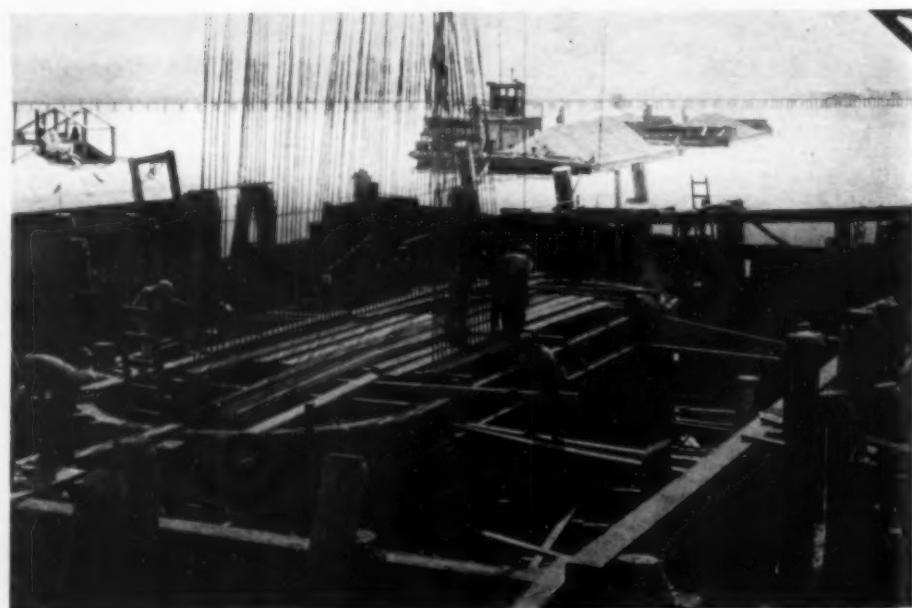
Bridge Builders Unwater to Bedrock

58-FT. SHEET-PILE COFFER

USING a single row of steel sheet piling to what is considered a record depth of 58 ft. for this type of construction, a pier for the new Southern Pacific railroad bridge across Suisun Bay, Calif., was constructed in the dry by Siems, Helmers & Shaffner, Inc., of St. Paul, Minn. After sinking a timber crib inside the sheet piling, the cofferdam was unwatered and the pier built up, cribbing being removed as concreting progressed.

Guide piles were driven on 7-ft. centers to form a rectangle approximately 47x71 ft. and were braced by batter piles. Bethlehem deep-arch sheet piles, 65 ft. long, were driven to firm bearing against a guide frame bolted to the inside of the timber piles.

The interior bracing was made up with 12x24-in. wales of single length, the side pieces being almost 70 ft. long. Struts in the lower part are 12x12-in. timbers, also unspliced. The vertical

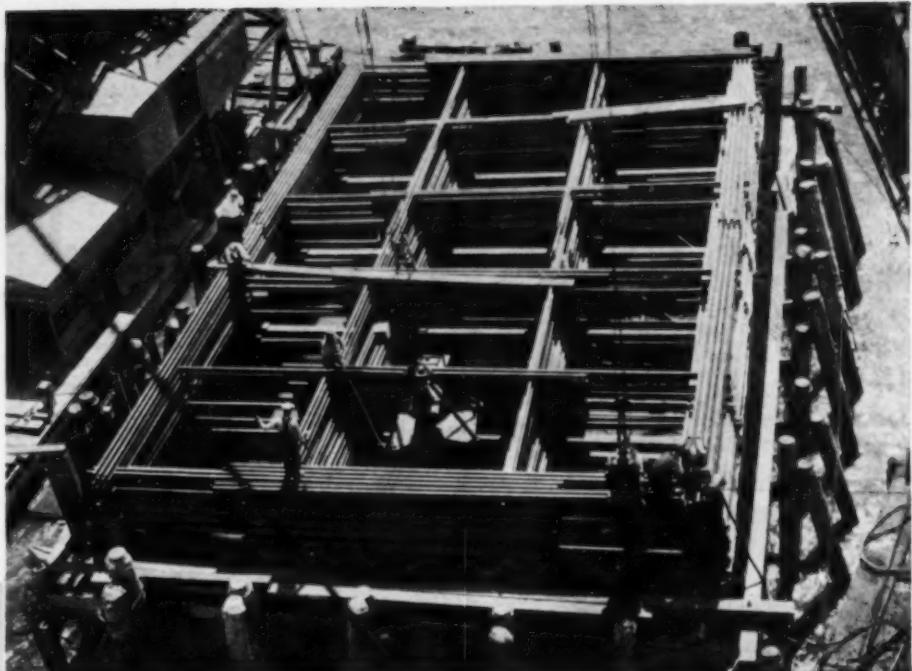


PIER CONSTRUCTION above water level. Heavy reinforcing is provided to resist earthquake stresses. Movable steel forms are used on the sides.

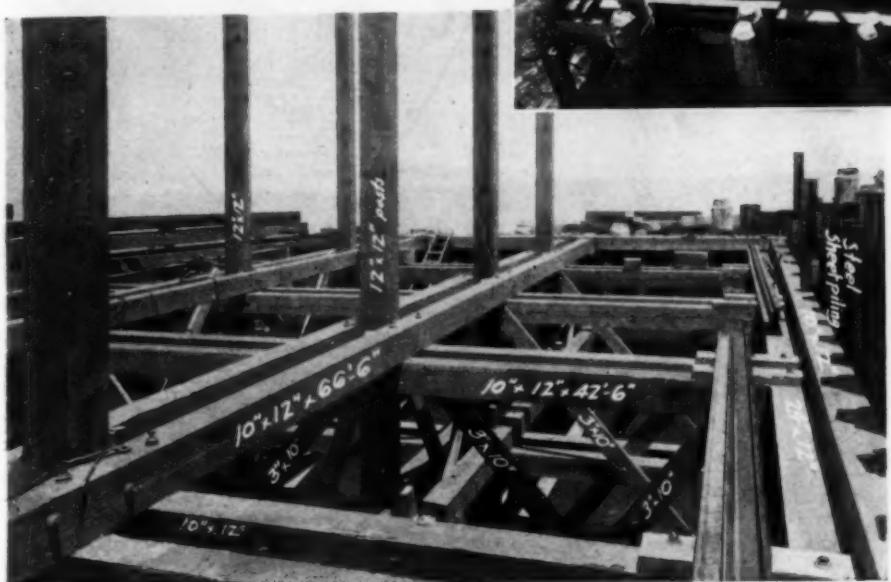
distance between wales varied from 5 ft. at the bottom to 12 ft. at the top. The two bottom sets were not connected to the upper portion of the framework and were left in the concrete.

About 3 miles of railroad rail was loaded on this timber cage to sink it. By dredging and jetting, the cribwork was sunk to bedrock. The sheet piling then was given a final driving that put it more than 2 ft. into the shale bedrock of the foundation. Three 10-in. Morris centrifugal pumps unwatered the cofferdam. After unwatering, a single Pulsometer pump was sufficient to hold down the leakage.

Bedrock was prepared in the dry and a floating concrete plant poured the foundation. The lower section of the



WEIGHTED WITH RAILROAD RAILS
cribwork is sunk through mud to bedrock by dredging and jetting.



TIMBER CAGE CONSTRUCTION
inside steel sheet pile cofferdam.
Wales are single-length 12x24-in.
sticks almost 70 ft. long.

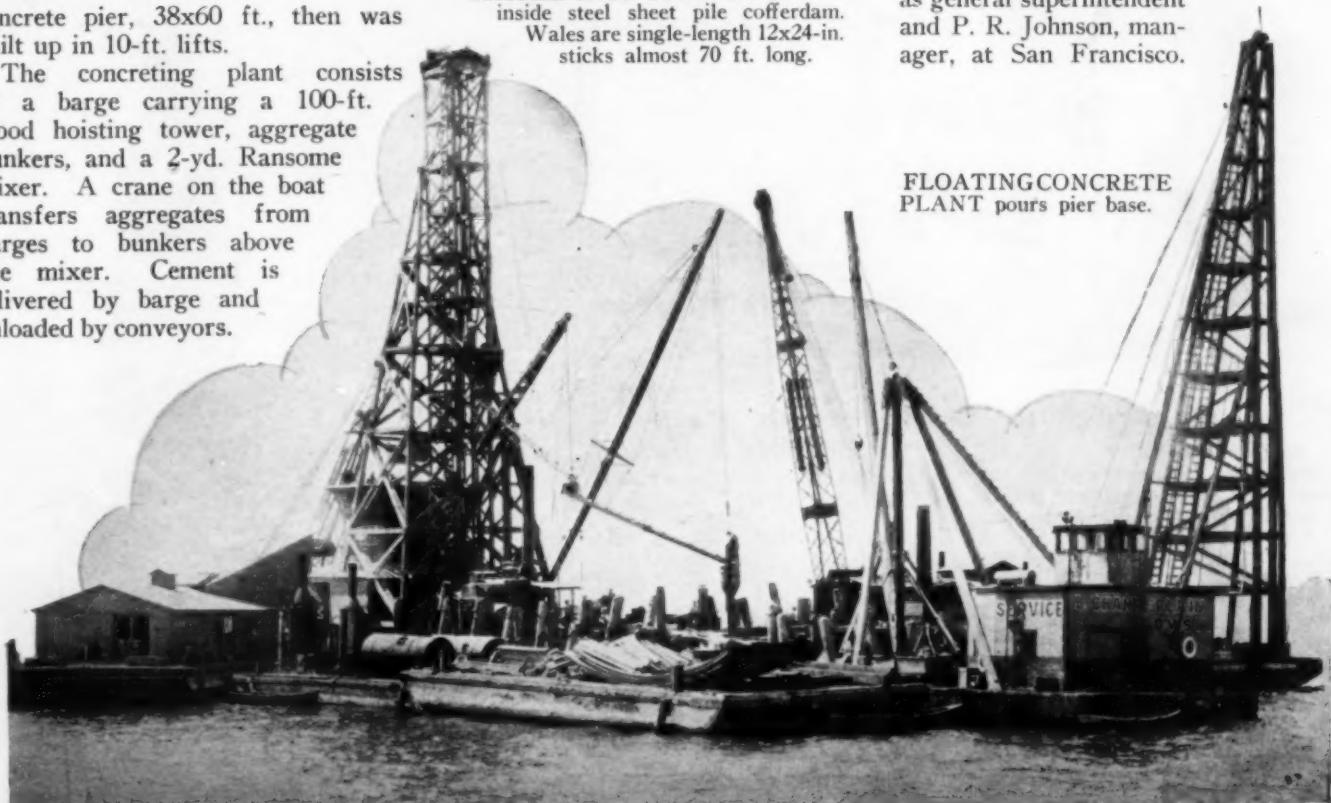
concrete pier, 38x60 ft., then was built up in 10-ft. lifts.

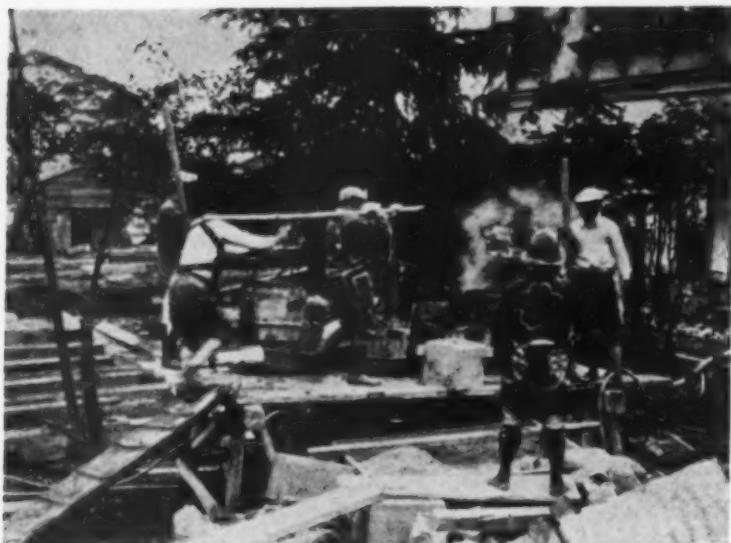
The concreting plant consists of a barge carrying a 100-ft. wood hoisting tower, aggregate bunkers, and a 2-yd. Ransome mixer. A crane on the boat transfers aggregates from barges to bunkers above the mixer. Cement is delivered by barge and unloaded by conveyors.

After completing this pier, the sheet piling was pulled and used at another of the shore piers.

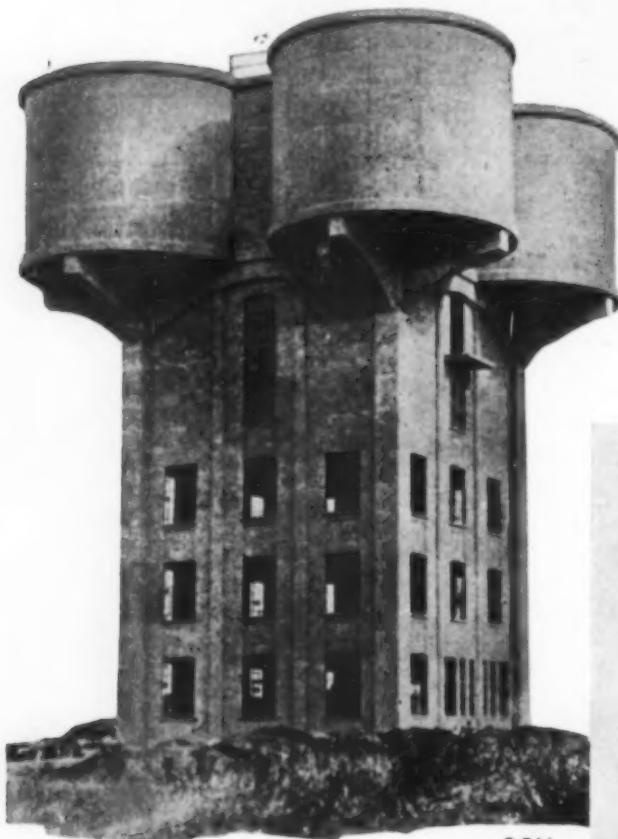
H. I. Benjamin, assistant bridge engineer of the Southern Pacific, is in direct charge of the project, under the supervision of C. R. Harding, engineer of standards, and W. H. Kirkbride, engineer of maintenance-of-way and structures. C. M. Kurtz, office engineer on the job, provided the accompanying pictures. For the contractor, N. F. Helmers, vice-president of the firm, is in personal charge, with C. E. Ryan as general superintendent and P. R. Johnson, manager, at San Francisco.

FLOATING CONCRETE
PLANT pours pier base.





JOB FOR TWO is handling of concrete aggregates in Japan where all native contractors have not yet become wheelbarrow-conscious. Mixer is run by steam engine, steam being supplied from boiler of pile-driver near by.



© P44
WATER SOFTENING PLANT occupies upper floors of this 80-ft. reinforced-concrete tower in Suffolk, England. Three lower floors are for offices. Water, after treatment, passes into five circular tanks for distribution to artificial silk works.

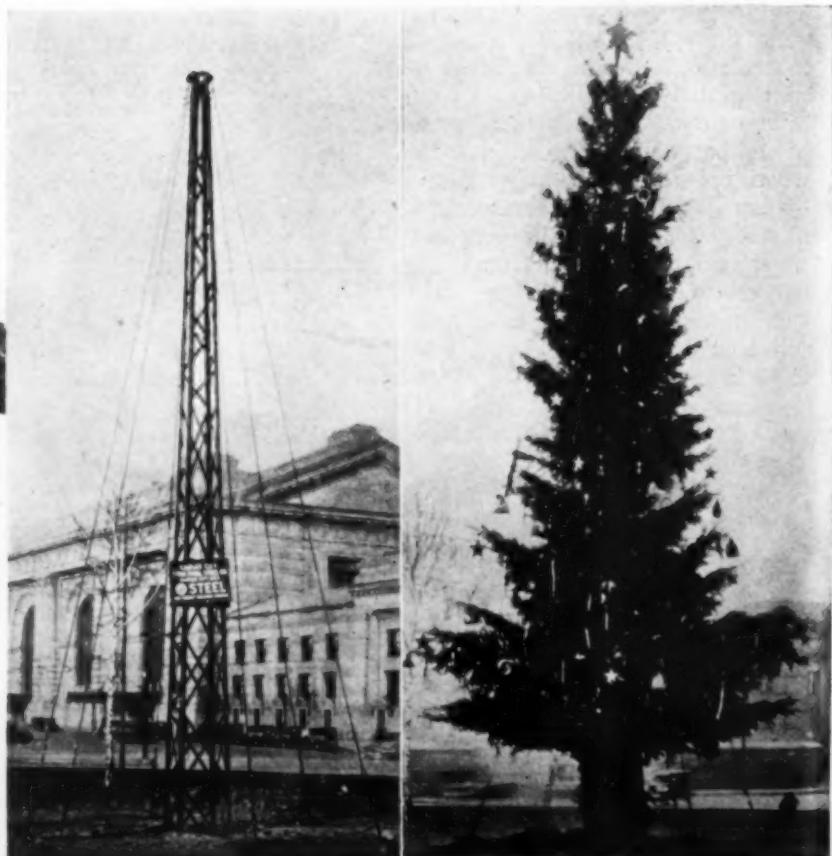
MAN-MADE CHRISTMAS TREE (right) built to order for mayor of Kansas City, Mo. Beginning with an all-welded steel mast, Kansas City Structural Steel Co. achieved a most natural and pleasing result. Lincoln stable-arc welders were used in fabricating steel mast.

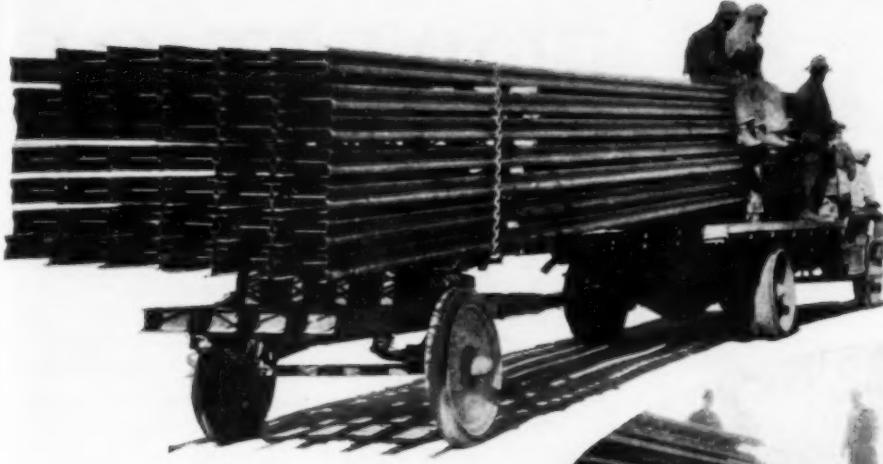
JOB ODDITIES

A Monthly Page of Unusual Features of Construction



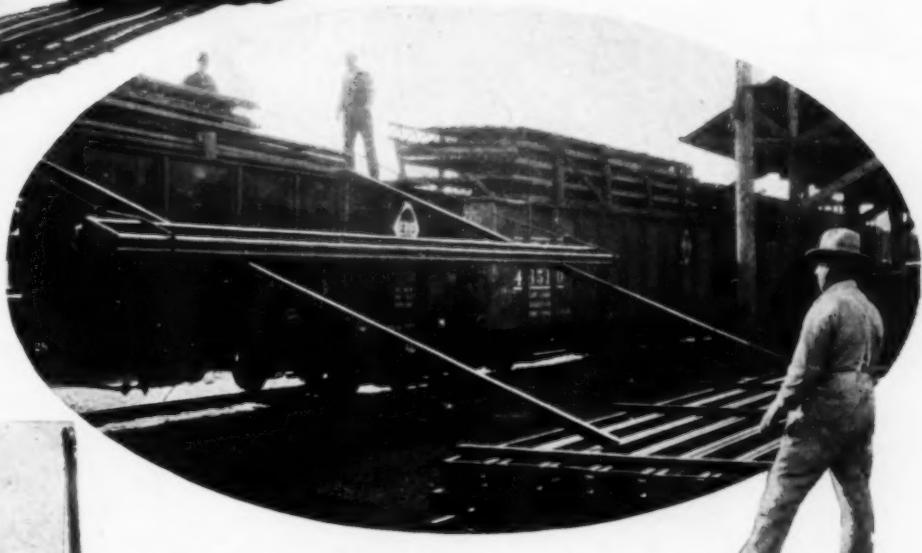
PRIMA DONNA'S TRACTOR. Amelita Galli-Curci, star of Metropolitan Opera Co., New York City, owns and uses this machine on her estate, "Sul Monte," near Highmount, N. Y.





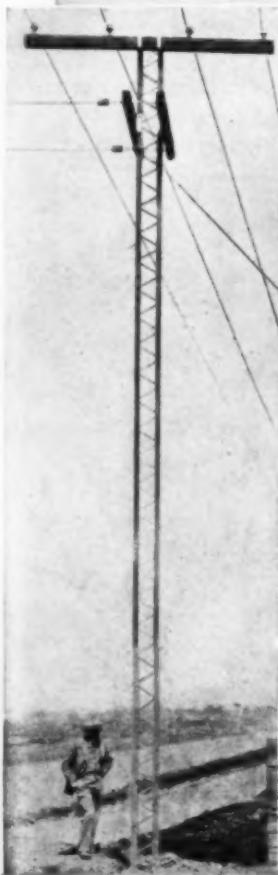
TRUCKS AND TRAILERS distribute loads of poles along the highways. (Below) UNLOADING steel poles by means of skids.

POWER AUGER AND GIN POLE (below), mounted on tractor, bore holes and set poles. (Below, left) CROSSARMS ARE ERECTED and wires strung 15 days after base is poured. Standard pole spacing is 16 to the mile. Cost of steel pole line averages \$1,200 per mile.



SPEED in Construction of STEEL POLE LINE

Photographs and Data from
H. J. LAWSON
Superintendent of Power,
Salt River Valley Water
Users Association,
Phoenix, Ariz.



AS PART of its great rural electrification program, the Salt River Valley Water Users' Association, Phoenix, Ariz., recently built 500 miles of steel pole line and rebuilt 250 miles of existing line in a period of 8 months. Copper alloy steel poles of the Truscon Steel Co. in lengths of 35 to 45 ft. were distributed by truck and trailer in advance of the erection crew. Two tractors equipped with augers and mast-and-winch outfits bored the holes and set the poles at the rate of 45 to 60 per day.

Each base required $\frac{1}{2}$ yd. of concrete. Aggregates for each half-mile of poles were dumped

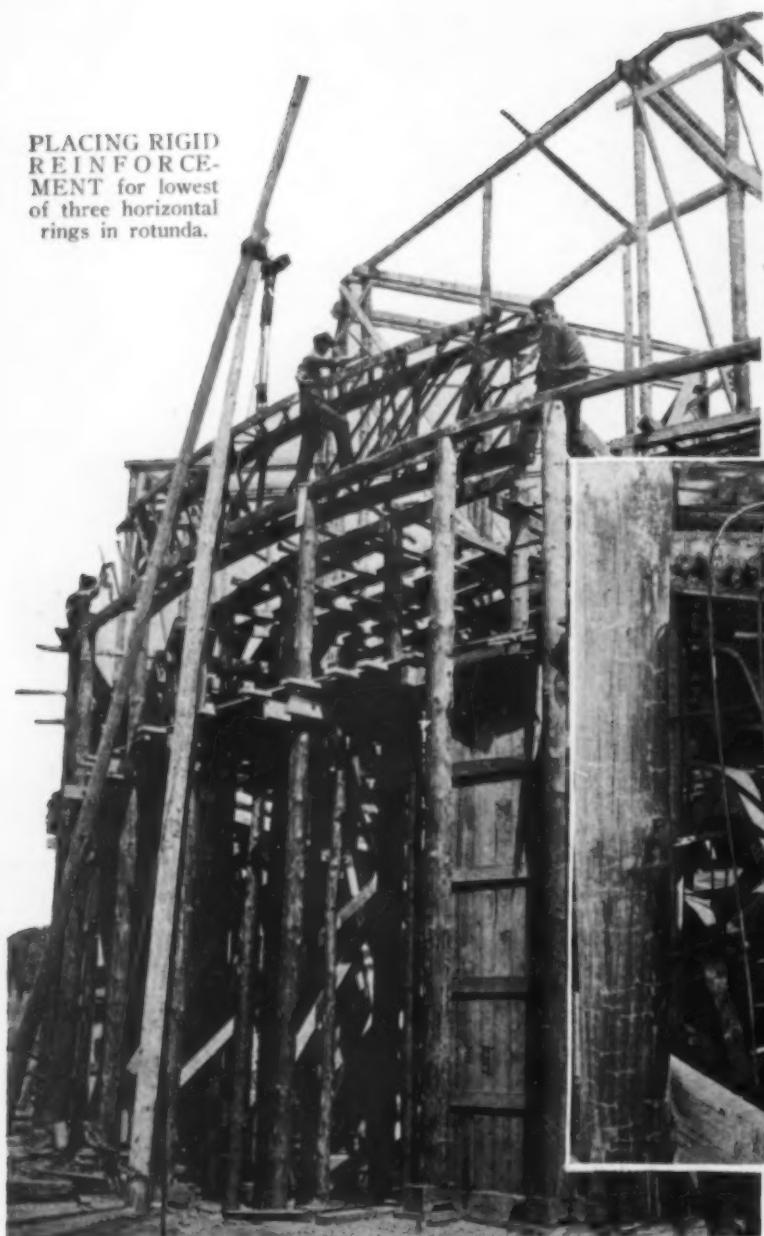
at $\frac{1}{2}$ -mile intervals along the highway, and cans holding the correct amount of aggregate for each pole were distributed from these piles by a 1-ton truck. Water, usually available from irrigation ditches, was handled in a similar manner. A three-man crew guyed the poles into position, and the concreting crew of five men, with a $\frac{1}{2}$ -yd. mixer pulled by a small automobile, poured 45 to 60 bases a day. Average distance between poles was 330 ft.

Construction was performed by association forces under F. L. Roe, superintendent of transmission. H. J. Lawson supervised the engineering work.

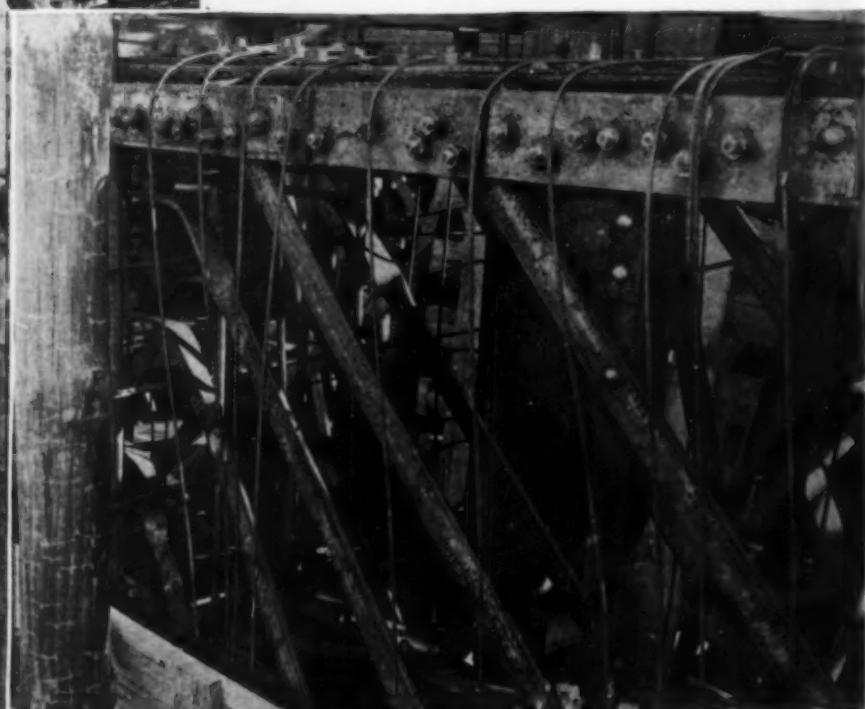


FOREST OF

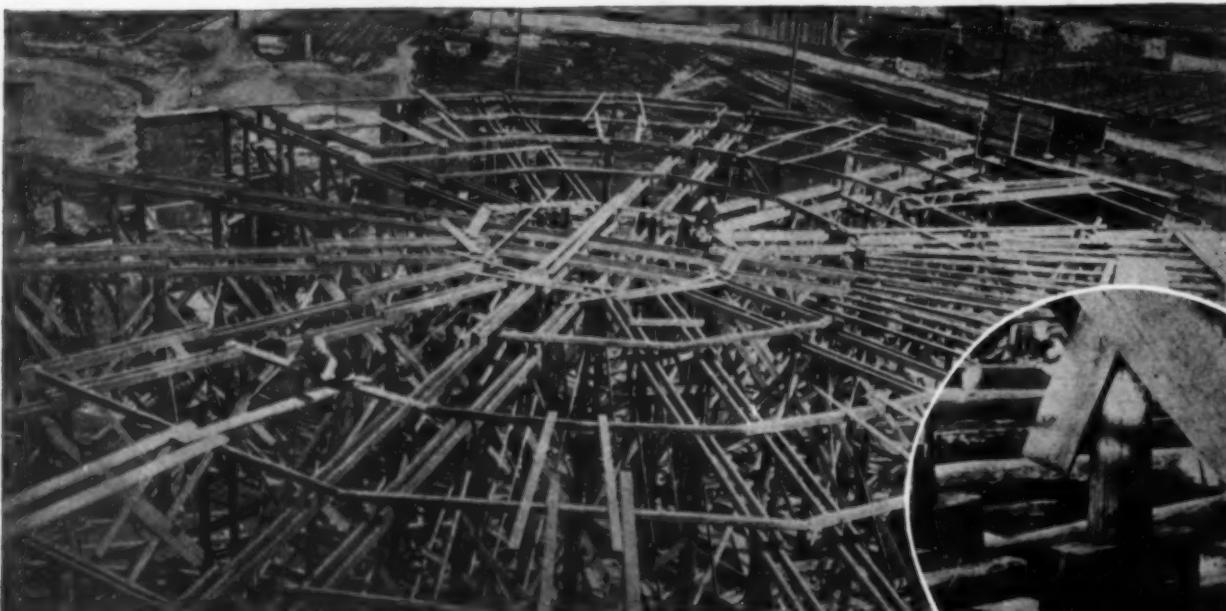
PLACING RIGID REINFORCEMENT for lowest of three horizontal rings in rotunda.



CONCRETE structures of unusual interest are involved in the construction of the rotunda and wings of the Exhibition Palace at Brno, Czechoslovakia. The rotunda consists of 24 arching ribs which converge upon a horizontal concrete ring at the



RIGID REINFORCEMENT placed in lowest horizontal ring of rotunda. The rings tie the 24 arching ribs together at three places.



ERECTING WOOD FALSEWORK for the construction of the twelve incomplete arches and the three horizontal rings of the rotunda. Falsework has been completed to the first level. (At right, in circle). SHORT LOGS under posts distribute load and expedite wrecking of falsework.

FALSEWORK

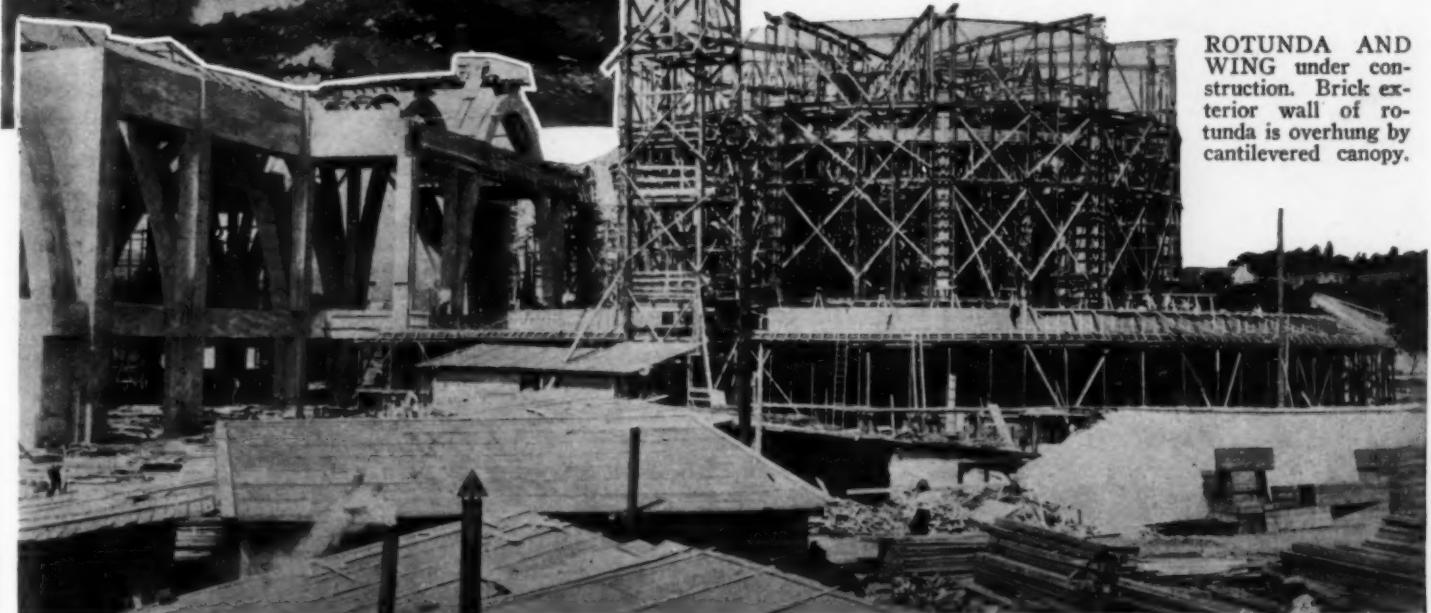
Supports Arch Forms

apex, 70 ft. above the ground. Distance on the ground between two halves of one of these dozen incomplete arches is 60 ft. Three horizontal rings in all are embodied in the reinforced concrete frame of the rotunda. Design of the wings is well illustrated by the photographs. The crossed arches at the intersections are the most notable features of the wing design.

A veritable forest of posts formed the supports of the rotunda falsework, which was erected in lifts. Notched timbers under the posts distributed the load on the sills and speeded dismantling.



FALSEWORK BRACING under arches of wing. Workmen are removing lagging. (Left) CROSSED ARCHES are feature of design of wings. Rotunda falsework in background.



ROTUNDA AND WING under construction. Brick exterior wall of rotunda is overhung by cantilevered canopy.

LIGHT, MOBILE CRANE

Expedites Public Utility Work

FOR various construction operations which face an electric light and power distributor, the Brooklyn Edison Co. has found lightweight, revolving, tractor-mounted cranes to be efficient means of speeding work and reducing costs. In certain phases of trench excavation, manhole construction, and lamp pole setting, the cranes have reduced the number of workmen, have cut the time for the operations and have freed other equipment for more profitable uses.

Pulling Sheetings—In the construction of manholes 17x4½x10 ft. deep for transformers, the sides of the excavation are retained by 2-in. planks against which the concrete walls are poured. After the concrete has set, the inside forms are removed and the plank sheeting is pulled. City regulations require that the sheeting be removed, and the power company naturally wishes to salvage the timber. By old methods, using a lever and manpower, the removal of the sheeting was

a 4-hour job for eight or ten men. The crane does the same work in 35 minutes with two men.

After pulling the sheeting, the crane lifts the two reinforced concrete slab



LARGE BOULDERS (above) are lifted from excavations and are loaded on trucks.

C R A N E P U L L S S H E E T I N G, up to 19 ft. long, embedded between sticky soil and newly constructed concrete wall of manhole. (*Inset*) T O S T A B I L I Z E C R A N E, operator releases lever which permits movable sectors on frame to engage with plunger rods mounted on both sides of front axle. Sectors and rods have matching rack teeth.

covers weighing about 3,200 lb. each from a truck and places them over the manhole. With the slabs in place, it lifts the transformers, up to and including 150 kva., from the truck and lowers them through the manhole opening.

Setting Lamp Poles—The cranes render another important service in setting lamp poles. When the concrete base for the pole is poured, a greased pipe is left in the concrete to form the hole in which the stem at the bottom of the pole is set. The first duty of the crane upon its arrival is to pull this pipe. The crane then unloads the



HEAVY, REINFORCED CONCRETE SLABS to cover manholes are unloaded from trucks and are placed by cranes.

pole from a truck and sets it on the base. An operator and two men set the lamp poles.

Large boulders encountered in excavating trenches formerly delayed the work and demanded a special trip from the company's yard of a truck-mounted air compressor with tools to break up the rock. The cranes in their daily routine now take care of these boulders up to 3,500 lb. in weight, lifting them from the excavation and loading them on trucks.

Dispatching System—An efficient dispatching system is employed to get full use of the cranes in their daily movements about the city. At the completion of each job, the operator reports by telephone to the dispatcher at the yard office and receives his orders to proceed to the next job. The effect of this dispatching system, combined

with the mobility and versatility of the crane, can be seen in the following typical day's work for one of the machines:

Location	Operation	Time, Hours
1	Lower two transformers	1½
2	Set lamp poles	2½
3	Shift lamp poles	½
4	Remove lamp poles	1½
5	Lower three transformers	1
6	Lower three transformers	1½

The distance covered between jobs on this day was more than 16 miles.

Description of Crane—The Brooklyn Edison Co. uses three Frederic H. Poor Inc.'s Loadmaster cranes for these various services. The crane is a compact unit, 65 in. wide and 8 ft. 9 in. high, mounted on a McCormick-Deering industrial tractor. A stabilizing device on the front axle enables the crane to handle loads of 3,000 lb.



CRANE HANDLES TRANSFORMERS, up to 150-kva. capacity, with ease. This machine is placing a transformer in a manhole.

at a reach of 8 ft. to the side without the use of stifflegs—a feature of great advantage when working alongside an excavation. The extra stability is obtained by locking the frame of the crane to the axle on both sides of the king pin, thus preventing the crane from turning on the pin.

SETTING LAMP POLES.
Small, mobile crane is most useful for this work in close quarters and on crowded streets.





CONCRETE for enlarging and strengthening lower Maumee River bridge piers is mixed at central plant on shore and is transported to piers over narrow-gage track suspended on outside of existing trusses.

Rebuilding RAILROAD BRIDGE PIERS

By D. T. JERMAN
*District Engineer,
The Foundation Company,
Pittsburgh, Pa.*

Under Traffic

UNUSUAL conditions were encountered in enlarging and strengthening existing bridge piers under traffic on the lower Maumee River bridge of the Toledo Terminal Railroad Co. This bridge was a single track through truss structure, E-40 rating. The substructure consisted of eight river piers and two abutments supporting seven fixed spans and one swing span.

This substructure was originally designed for a double track E-40 loading. The Toledo Terminal Railroad Co. desired to have these piers reconstructed for a double track E-70 loading, but required that this work be done without interference to traffic, which was very heavy over the bridge.

Condition of Piers—The river piers were originally constructed of stone masonry set up on timber mats 4 ft. thick from 8 to 23 ft. below river level. These mats, in turn, were supported by piles. At this point, there is approximately 30 ft. of clear water in the channel.

Upon investigation it was found that all of the river piers were scoured

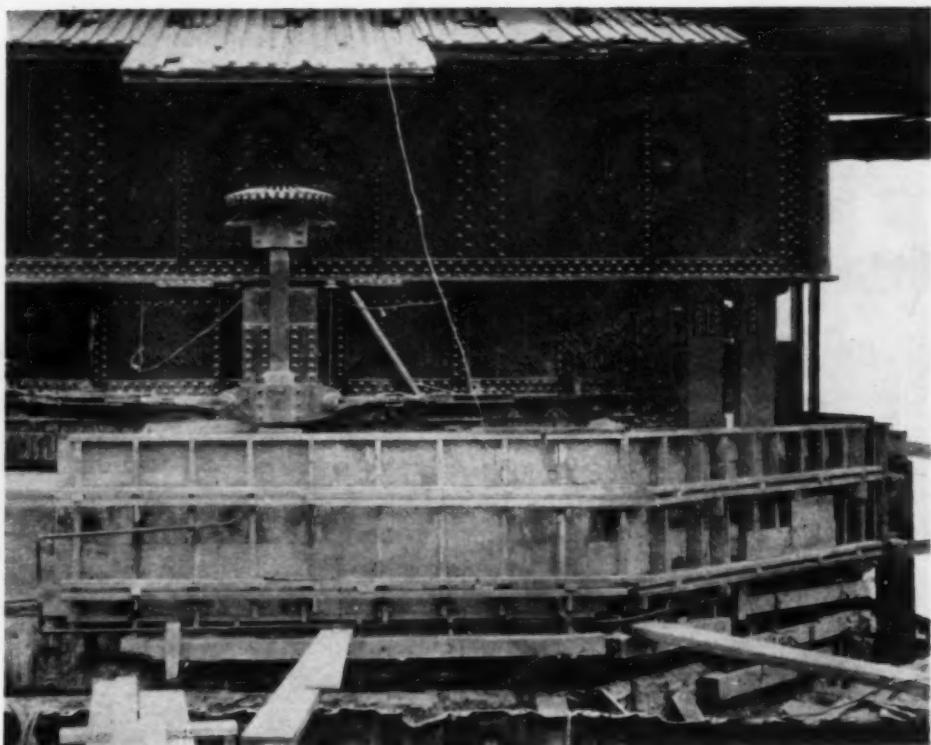


PILES UNDER PIER NO. 6, which was struck by steamer, are inclined approximately 10 deg. to the vertical. New mats are heavily reinforced with railroad rails. Steel sheeting protects new foundations from scour.

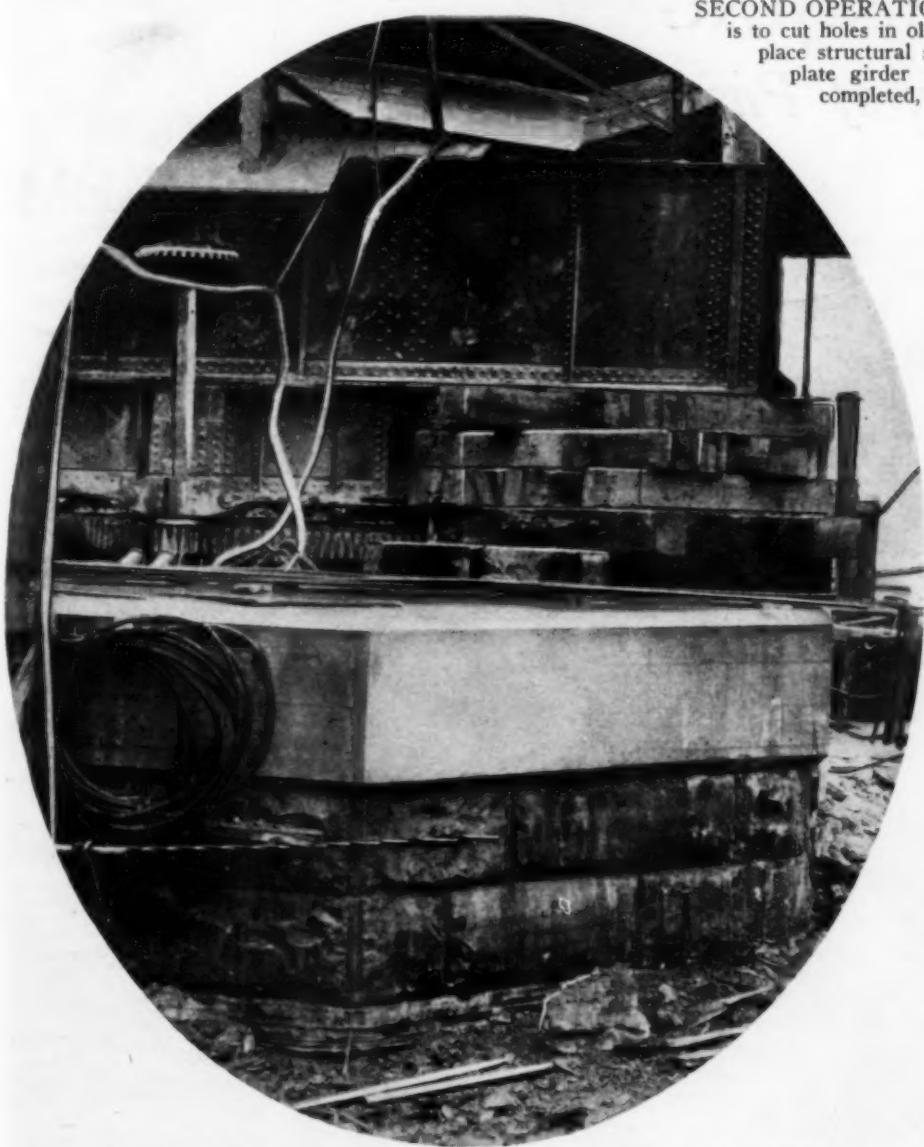
from 5 to 10 ft. below the timber mats and that between the piles was a deposit of fine river silt about 4 ft. thick. Pier No. 6, which held one end of the swing span, had been hit by a steamer, and the whole pier was pushed bodily 10 ft. upstream off some of its piles.

Reconstruction Operations—Reinforcing the piers to carry the new loading required: unwatering of the piers in steel sheeted cofferdams in about 15 to 30 ft. of clear water; excavating the soft silt to good hard bottom; driving approximately 80 additional piles around the perimeter of the old base of each pier; encasing the old and new piles in a reinforced concrete mat from 2 to 4 ft. larger on all sides up to the top of the old wood mat, entirely encasing the wood mat; and, then, grouting between old and new mats to insure good bearing between the two.

Reinforcing of the piers also required cutting off about 4 ft. from the tops and replacing them with a rein-



SECOND OPERATION of shoring up plate girders under swing span is to cut holes in old coping to depth below level of new coping and place structural steel columns in these holes to carry one side of plate girder frame. With shoring under plate girders thus completed, balance of old coping can be removed and new coping placed.



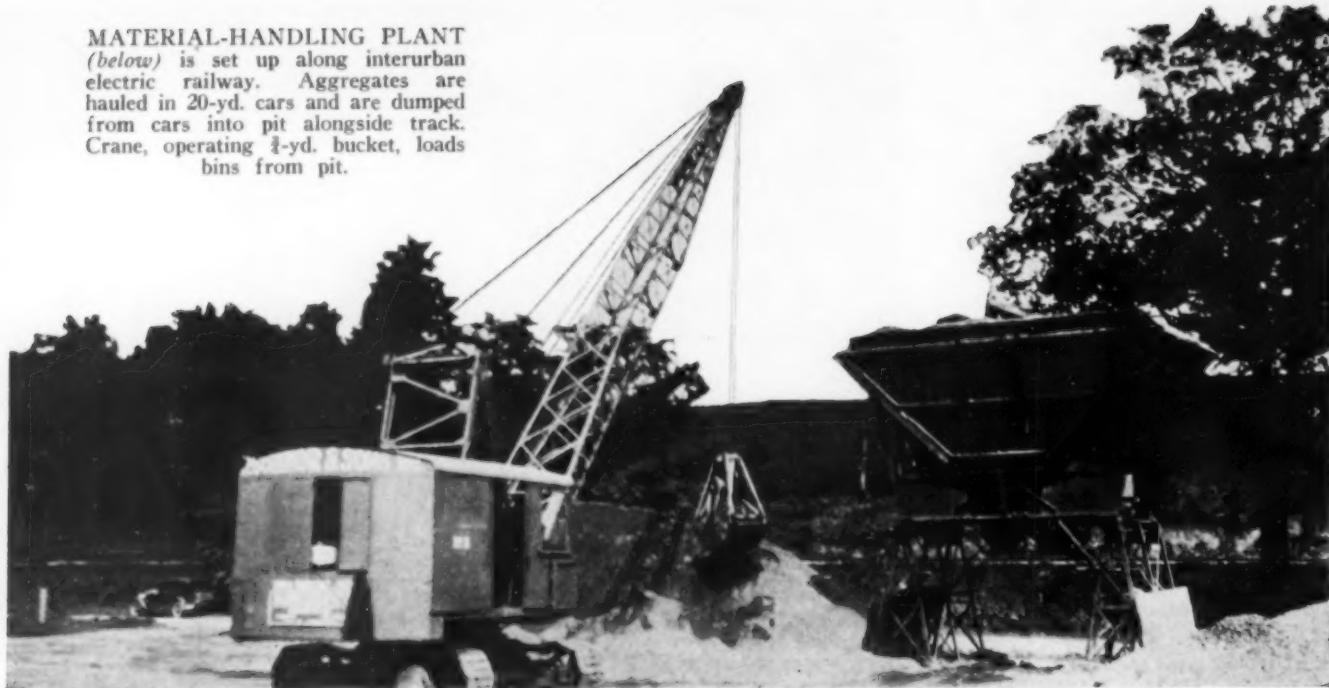
FIRST OPERATION of replacing coping on swing span pier is to cut away one-third of old coping and pour this portion of new coping. When concrete is strong enough, ends of plate girders carrying drawspan are shored up on wood blocking from new coping.

forced concrete coping, the tops of which are 2 ft. below the original copings. This change was accomplished on the piers of the fixed spans by cutting out all the coping except the small pedestals for the present bridge bearings and placing the new coping over this portion. After the new coping had set sufficiently, the load of the bridge was transferred by shoring beams on to the new coping on either side of these pedestals, and then the remaining coping was completed.

Replacing Coping of Drawspan Pier—Pier No. 5, supporting the swing span, presented a more difficult problem. As river traffic could not be interrupted, this pier was treated after Dec. 1, when river traffic was closed down for the winter season. The load of the drawspan is transmitted to the roller bearings by means of four heavy plate girders forming a square, the sides of which equal the diameter of the roller bearings. By shoring up these girders, it was possible to carry the whole load of the swing span and machinery.

The Foundation Co. was the general contractor, the work being handled by the Pittsburgh district organization, with George R. Johnson, vice-president, in charge. F. J. Bishop, bridge engineer of the Toledo Terminal Railroad Co., was in charge of the design and supervised the construction for the railroad company, with H. Ibsen as consulting engineer.

MATERIAL-HANDLING PLANT (below) is set up along interurban electric railway. Aggregates are hauled in 20-yd. cars and are dumped from cars into pit alongside track. Crane, operating $\frac{1}{2}$ -yd. bucket, loads bins from pit.



ADVANCE PLANNING *as Solution of Paving Contractor's* SHOULDER PROBLEM



R. E. O'CONNOR (center), president of the contracting organization; J. R. MILLER (right), job superintendent, and B. R. TUCKER, gravel plant foreman.

BATCH HAULING (right) is performed by trucks. All of road forms (5,000 lin.ft.) are kept down. Night gang pulls and sets forms, removes burlap, and covers slab.



IN CONSTRUCTING $17\frac{1}{2}$ miles of 9-7-9-in. pavement 18 ft. wide for the Indiana State Highway Commission on two adjoining federal aid projects of U. S. Route 24, J. C. O'Connor & Sons, Fort Wayne, Ind., employed a novel method to solve the shoulder problem and installed a gravel plant to take advantage of the local supply of this material.

Location of Road—The $17\frac{1}{2}$ -mile contract section ran east from a point $2\frac{1}{2}$ miles east of Peru, skipping Wabash, to a point approxi-

mately 2 miles east of Lagro. About $1\frac{3}{4}$ miles is new location. For 6 miles at the west end, the road utilizes about half the width of the old Erie Canal, through the Wabash River bottoms. Fill for this portion was made largely from the spoil banks of the canal. The new road, saving approximately 4.4 miles in distance and eliminating ten railroad grade crossings, is an example of careful, courageous location to provide best for the needs of traffic.

As soon as the contract for the work

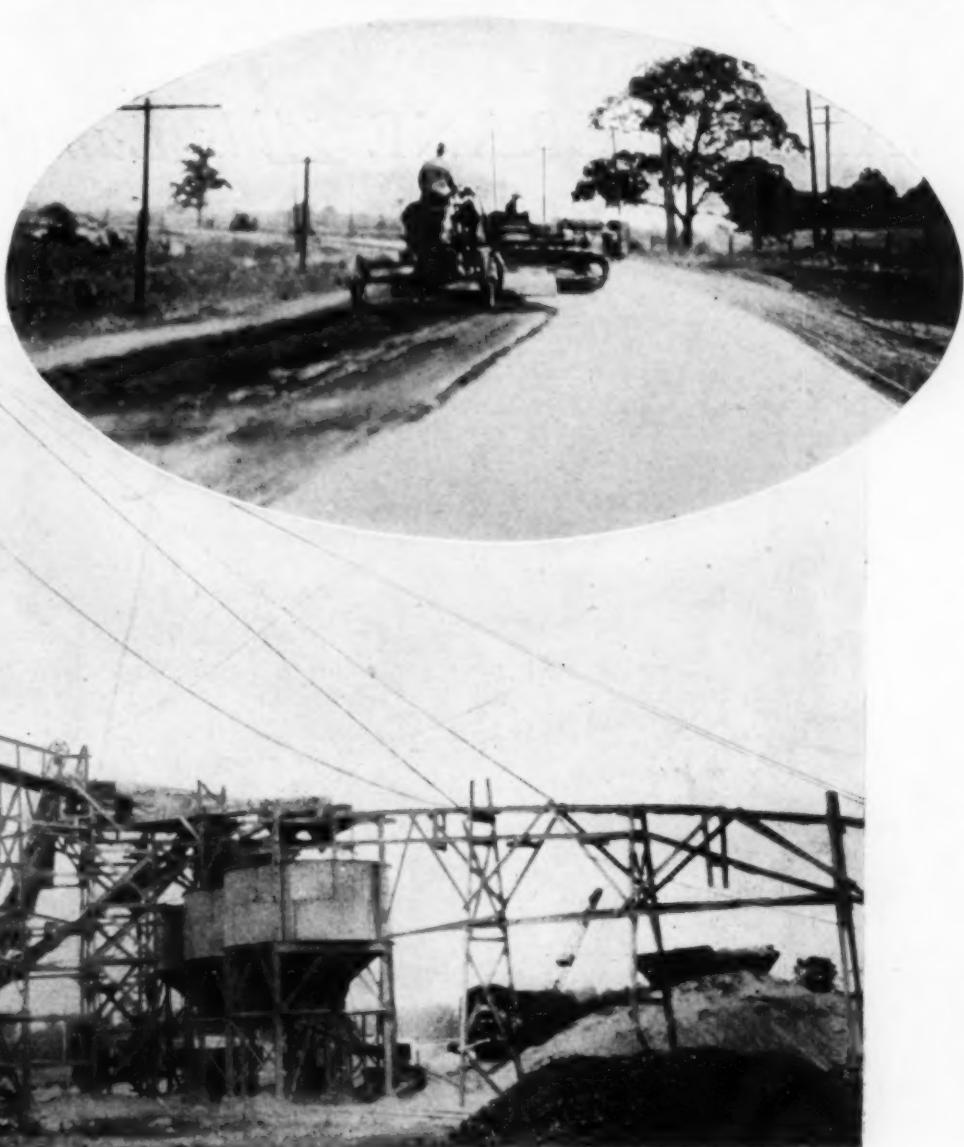
ment surface on low fills and to within .1 ft. on fills of 5 or 6 ft. No attempt was made to slope the sides of the fill, as enough excess material was placed on top to finish $1\frac{1}{2}:1$ slopes in the spring.

Most novel of the methods used on the grading work was the employment of a Western elevating grader to prepare the subgrade. The elevating grader proved very efficient for this use, cutting almost to form grade. Some improvement in the means of

ing on a 500-ft. span is operated by a high-speed steam hoist from a 106-ft. steel mast which provides 26 ft. of clearance over the gravity screening and chuting tower. By shifting the mast around three sides of the tower, the scraper can dig a full half circle.

An electric interurban line which passes the plant and parallels the road offered a ready means of hauling to the material-handling set-ups. Four set-ups were decided upon, one at the gravel plant and three at intervals along

GRAVEL PLANT (*below*) is fed by $1\frac{1}{2}$ -yd. drag scraper bucket which dumps on grizzly at top of 80-ft. tower. **TRACTOR AND BLADE GRADER** (*right*) shape shoulders close behind paver. Elevating grader, which cuts subgrade on fills purposely built a little high, deposits enough earth outside subgrade to provide for shoulders.



was awarded in the fall of 1928, a grading force was put in the field to build the 6-mile fill across the river meadows. Grade of the fill was above the level of all ordinary spring floods; in only two places was it below the level of the extraordinary 1913 flood.

Providing Shoulder Earth—On this fill, as on all others included in the job, the contractor deposited enough earth to provide for the final cross-section, shoulders included. The usual grade of fill for pavement, Indiana specification, is .3 ft. below top of slab. J. C. O'Connor & Sons made arrangements to build the fill to within .2 ft. of pave-

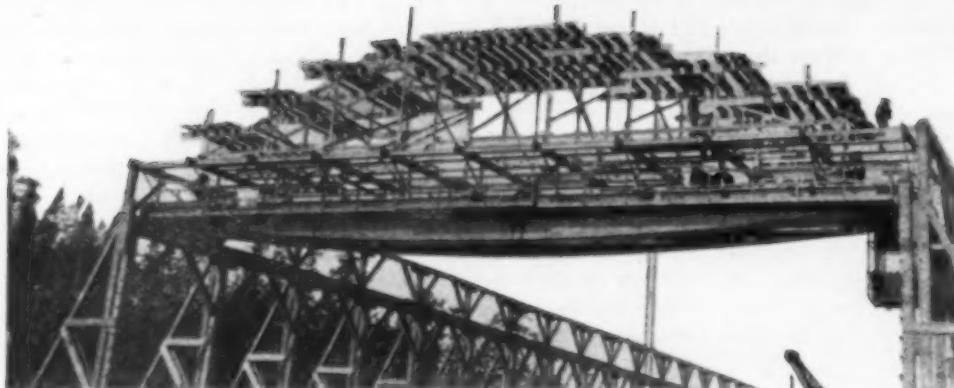
controlling the level of the disk would make the elevating grader an ideal machine for subgrade work. The grader cast the earth from one side of the road to the opposite shoulder. A small Adams blade grader, a Hug sub-grader, and a Huber 10-ton roller completed preparation of the subgrade.

Gravel Plant—A good gravel deposit was available at the west end of the job, and the contractors decided to make use of this local supply. They installed a plant capable of producing from 250 to 300 cu.yd. of coarse aggregate in 11 hours. At this plant, a Sauerman $1\frac{1}{2}$ -yd. power scraper work-

the job. Aggregates were hauled in Western and Differential 20-yd. dump cars and were dumped into plank-lined pits of five-car capacity alongside the track. Autocar two-batch trucks and United single-batch trucks hauled to the Rex 27-E paving mixer.

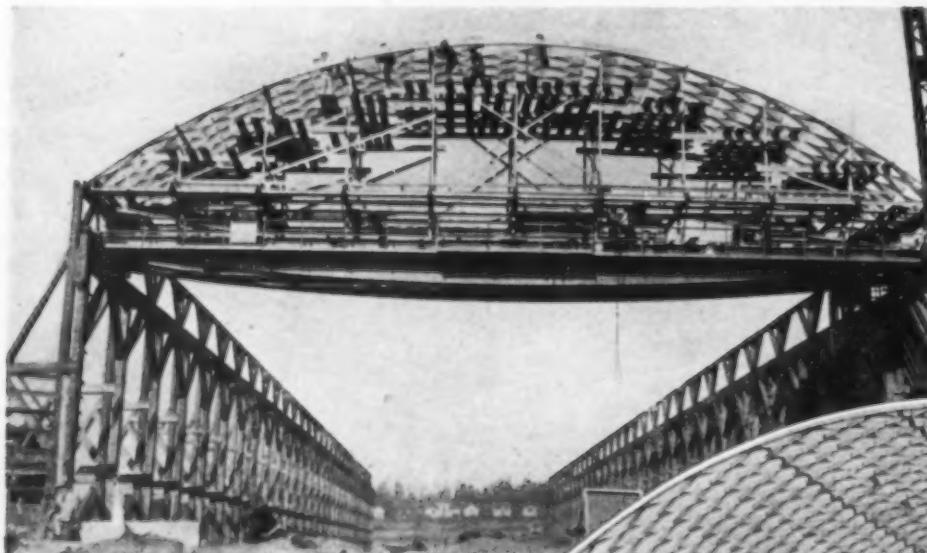
The work was performed under the general supervision of Lloyd Kemmer, district engineer, and under the direct supervision of R. D. Baker and E. L. Duckwall, project engineers. For the contractors, J. R. Miller, superintendent, was in charge, with R. E. O'Connor, president of the concern, maintaining an active interest in the job.

TRAVELING BRIDGE of permanent gantry crane affords base for scaffold used in erecting lamella roof.



STAGING, here placed on gantry crane, usually must be erected on traveling platform running over rails laid on ground.

GANTRY CRANE *Aids Lamella Roof Erection*

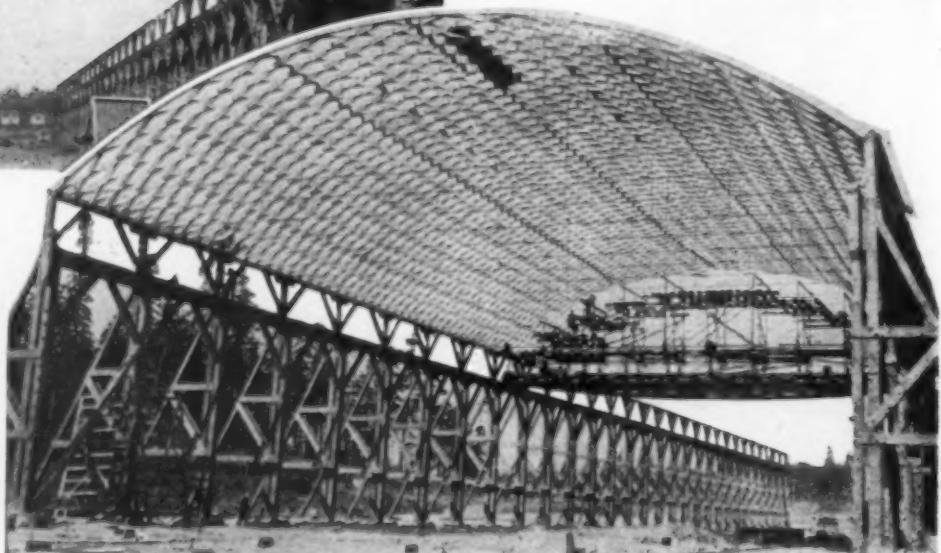


of which are formed by the lamellas, timbers of equal length. Each lamella is joined at each end to the central point of another lamella, and the ends of two more lamellas join it at its center. Thus, stresses are well distributed through the structure. Connections are made with bolts and spring washers.

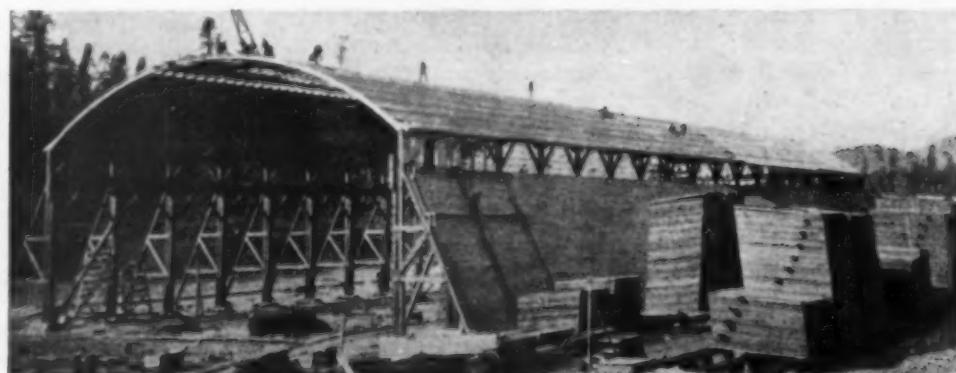
The lamella roof lends itself almost to any shape of arch or dome. Horizontal thrust can be taken by tie rods or by buttressing the building walls.

A PERMANENT gantry crane erected on the runway girders of the E. K. Wood Lumber Co.'s new planing shed at San Francisco offered a novel base for the movable scaffold used in constructing the lamella roof of the building. The usual procedure is to lay the rails on the ground and to erect high staging on the traveling platform.

This type of roof is made up of a meshwork of parallelograms, the sides



TIE RODS OR BUTTRESSES can take horizontal thrust of lamella arched roof.



HORIZONTAL THRUST from roof of San Francisco building is taken by both tie rods and buttresses.

Present and Accounted For -

A Page of Personalities



E. M. SCOFIELD, head of Scofield Engineering Construction Co., Los Angeles, has been appointed a member of Los Angeles Board of Water and Power Commissioners.

GEORGE WIDUA (*above*), of Woods Brothers Construction Co., Lincoln, Neb., is new chairman of Construction Section of National Safety Council. WILLIAM G. WHEELER (*right*), executive secretary, Building Trades Employers' Association, New York, is new vice-chairman.



SHAFT-SINKING CREW of Patrick McGovern, Inc., using Chicago Pneumatic rock drills, sinks circular shaft, 18 ft. 6 in. in diameter, 108 ft. through hard rock in 10½ hours on New York City water supply tunnel job. F. E. STOKES (*left, above*) directs operations at this shaft.

NEW EQUIPMENT ON THE JOB

Produces Uniform Concrete Mix

An important feature of this central mixing plant is the "Weigh-Mix," a new development of the T. L. Smith Co., Milwaukee, Wis. This device is a



complete, self-contained unit that accurately proportions all materials by weight and then mixes them, thus assuring a uniform quality of concrete. One man can handle all operations from a steel platform on which the control levers are centralized.

New Portable Arc Welder

Ease in starting, steadiness of operation and greater capacity are the advantages claimed by the General Electric Co. of Schenectady, N. Y., for



its new six-cylinder portable electric arc welding machine. The welding generator is rated 300 amp., with a current range of 90 to 375 amp., N.E.M.A. standard. A resistor ad-

justs currents down to 25 amp. When operating at 25 v. at the generator panel, any current can be obtained between 25 and 400 amp. The set is 88 in. long, 32 in. wide, and 96 in. high; net weight without running gear, is 3,300 lb.

Forms Quickly Erected

A standardized form for concrete columns which has but half the weight of the ordinary board form and which can be made, erected and dismantled in much less time, has been put on the

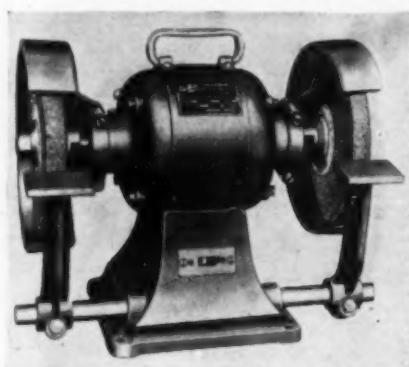


market by the Dowd Concrete Form System, Inc., Chicago, Ill.

This form is adaptable to both steel skeleton and reinforced-concrete column construction and can also be used for foundation piers and for fire-proofing wood columns. In erection, lightweight siding is nailed to vertical wood chamfer corners and to vertical battens, the assembly being held together by column clamps which are taken off when the form is removed.

Bench Grinder

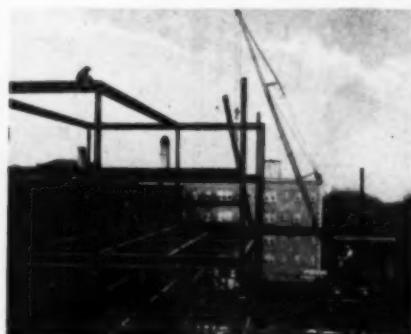
The Van Dorn Electric Tool Co., Cleveland, Ohio, announces a new 7-in. bench grinder for sharpening edge



tools and for light grinding. The machine is claimed to be vibrationless at all speeds. Ball bearings are mounted in dustproof housings.

Traveling Carriage for Cranes

A special, structural steel, telescopic, traveling carriage mounted on wheels which will fit rails of 15- to



20-ft. gage laid on top of the structural beams of the building is being developed by the Universal Crane Co., Lorain, Ohio, for use with its cranes for steel erection or demolition of buildings.

Improved Floor Grating

The Walter Bates Steel Corporation, Gary, Ind., manufactures an open steel floor grating with a rigid tongue-and-



groove joint, made as illustrated here. The grooved cross bars are threaded through the main bars, turned up under great pressure, and the tongues forced back into their original position.

news
from
THEW

THE W HEAVY DUTY

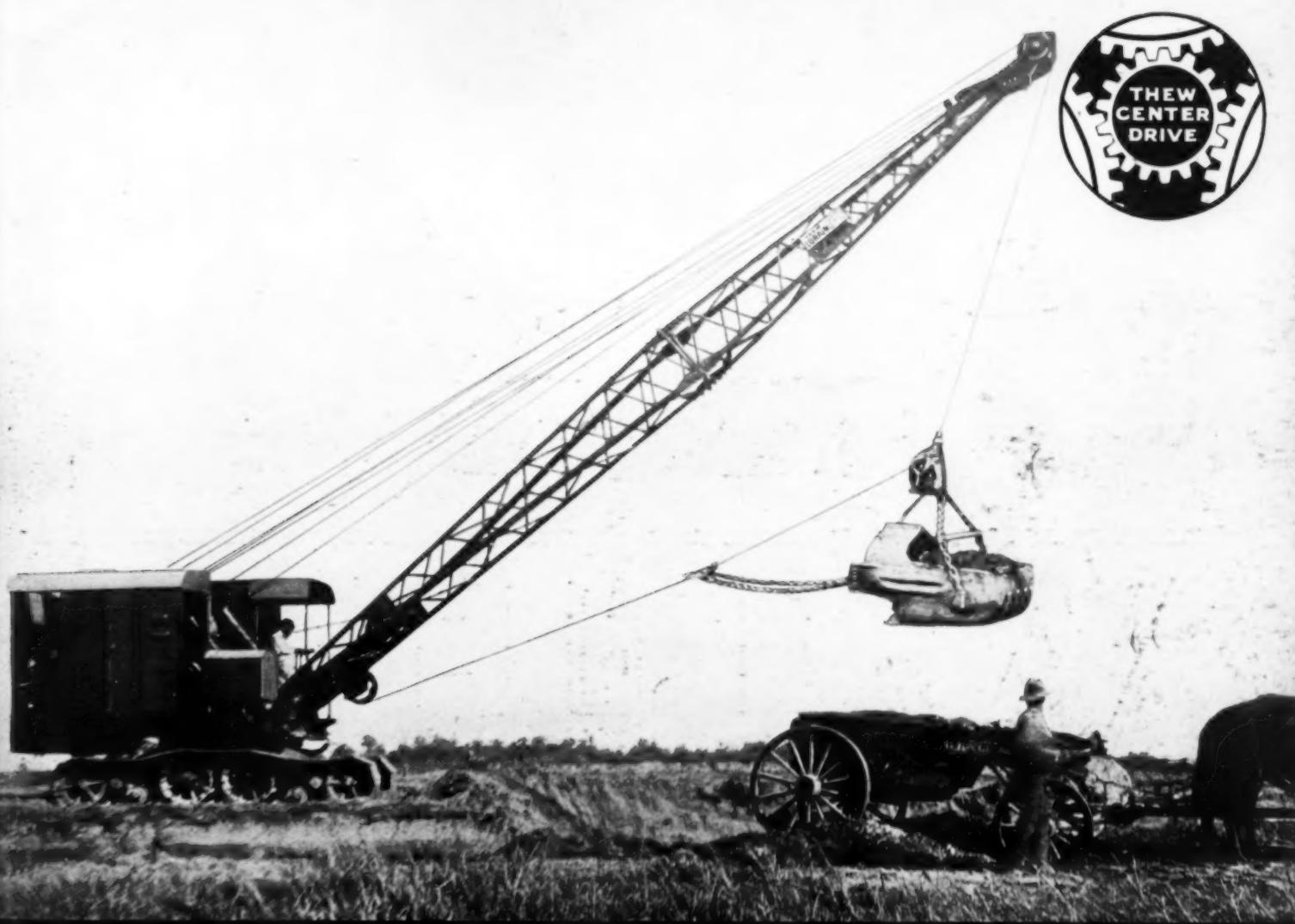
Better Than



A BIGGER GAS, Diesel or Electric motor... 97 H. P. in the gas engine with a follow through of smashing power for the peak loads. An improved "56" Tread Crawler — 2 Speed Center Drive... longer, heavier, and more powerful than ever before. Simplified clutches with roller bearing boosters... automatic dipper trip.... And improvements and refinements that make this the best machine Thew has ever built.

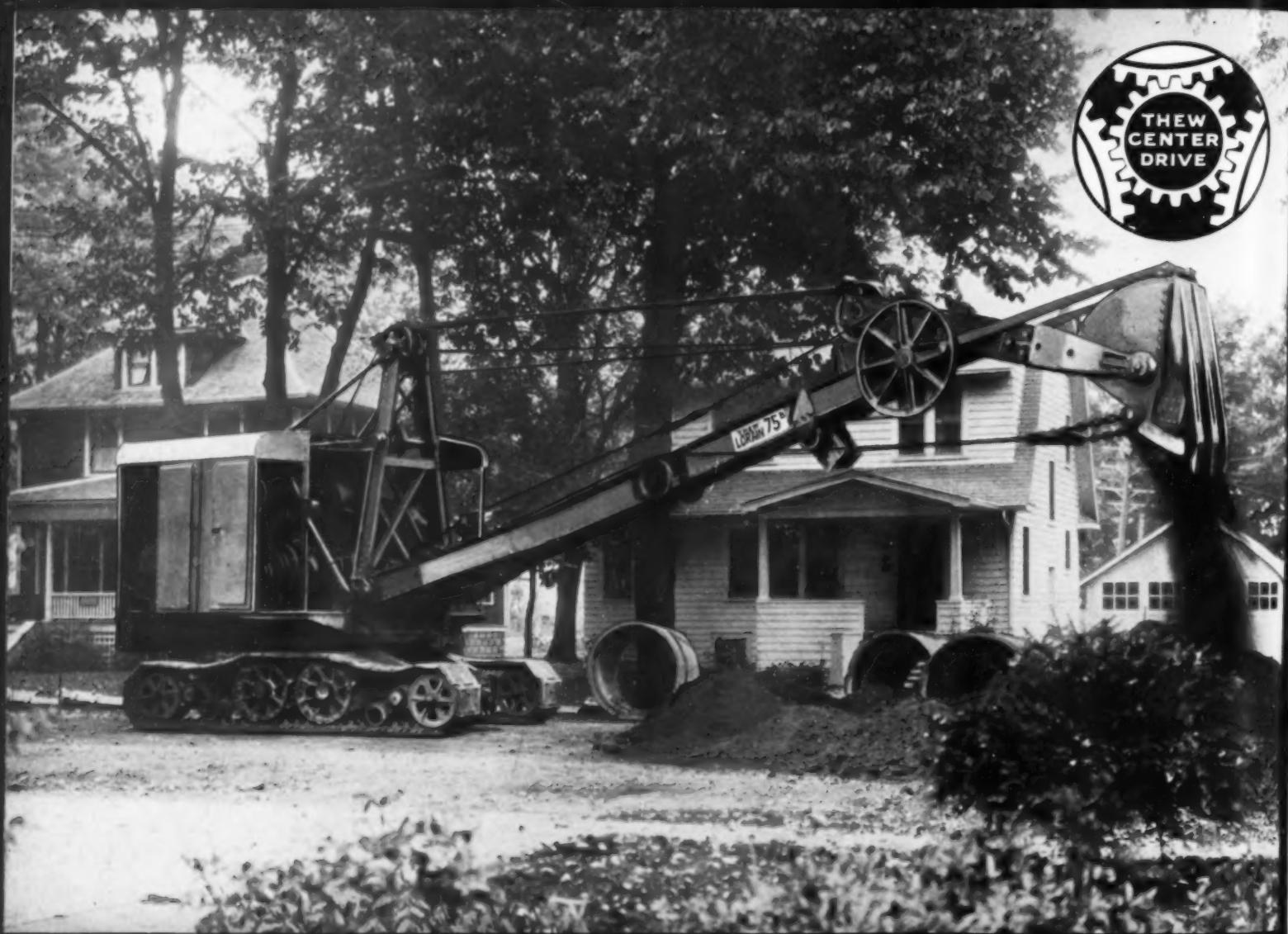
1½ YD. LORAIN 75^B

Ever Before



THE NEW heavy duty power plant and Center Drive super-structure convertible to crane, clamshell, or dragline... hoists, swings and travels simultaneously. Newly developed "64" and "68" Tread Crawlers with equalizer rocker arms... greater over-all length... increases supporting area... reduces ground pressure 15% to 25%... "Noses out" of soft material—rolls up and over broken ground.....

Heavy Duty Lorain 75^B BACKDIGGER



An improved backdigger boom with simplified, direct application of power to the dipper . . . backed by a more powerful motor. New type "64" and "68" Tread Crawler—2 Speed Center Drive . . . self adjusting to the unevenness of the ground . . . equalizer rocker arms eliminate digging in . . .

*See these machines at the Road Show
or write to us for complete descriptions.*

THE THEW SHOVEL COMPANY • LORAIN, OHIO

TWO 28-S *Ransome* STANDARD BUILDING MIXERS

**Help build the LONGEST
MULTIPLE ARCH CONCRETE
HIGHWAY BRIDGE *in the WORLD***



This bridge will be a new link in the Lincoln Highway across the Susquehanna River between Columbia and Wrightsville, Pa. Including approaches, it will be 7,400 ft. long. 100,000 cu. yds. of concrete will be used in its construction.

It is not unusual to find Ransome Mixers — and other Ransome equipment — on jobs of this size.

On the San Francisco Bay Bridge — on the New Jersey-Staten Island Bridge — on the new Hudson River Bridge — big Ransome Mixers have been used by the big contractors who must depend upon equipment that can produce large output in record time.



Send for Ransome Bulletins that will give you all the details about the 28-S and larger size Mixers suitable for big jobs. Read them and you will see why Ransome has been the leader for 79 years!

One of the two Ransome 28-S Standard Building Mixers used on this job owned by the Wiley-Maxon Construction Company of Dayton, O.

**1930
CONVENTION &
ROAD SHOW**
A. R. B. A.
ATLANTIC CITY N.J.
JANUARY 13-18

Dunellen

1850—Service for 79 Years—1929

New Jersey

Ransome Concrete Machinery Company



They
Repeat"

The Record

AFTER having used Marion Gas-Electrics for 5 years Mr. Ottesen of John Ottesen Company, Inc., Seattle, Washington, bought his third in March 1928. This one further confirmed his faith in Gas-Electrics so that in October 1928 he bought his fourth Marion Gas-Electric. This continued confidence is both a great satisfaction to us and a solemn obligation upon us. It is to you the best testimonial in the world.

Investigate the merits of Marion equipment when next you purchase excavators. And ...

*When you think of Shovels,
think of Marion.*

THE MARION STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A.

MARION

Photo shows size 2 Union Hammer driving wood piles for a grade crossing elimination.

DRIVE with UNION HAMMERS



Whether you make a satisfactory profit on the job or not is largely determined by the performance of the equipment you use.

By reducing pile driving and pile pulling to a science Union Hammers are protecting the profits of contractors in all parts of the world. Made in 10 sizes, there is a Union Hammer to exactly suit the type and size of piling to be driven. Special bases enable you to get them down with the greatest possible speed — *without damage to the heads*. Rugged construction ensures low maintenance, freedom from profit-consuming delays, and long service-life.

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UNION IRON WORKS

Engineers and Manufacturers

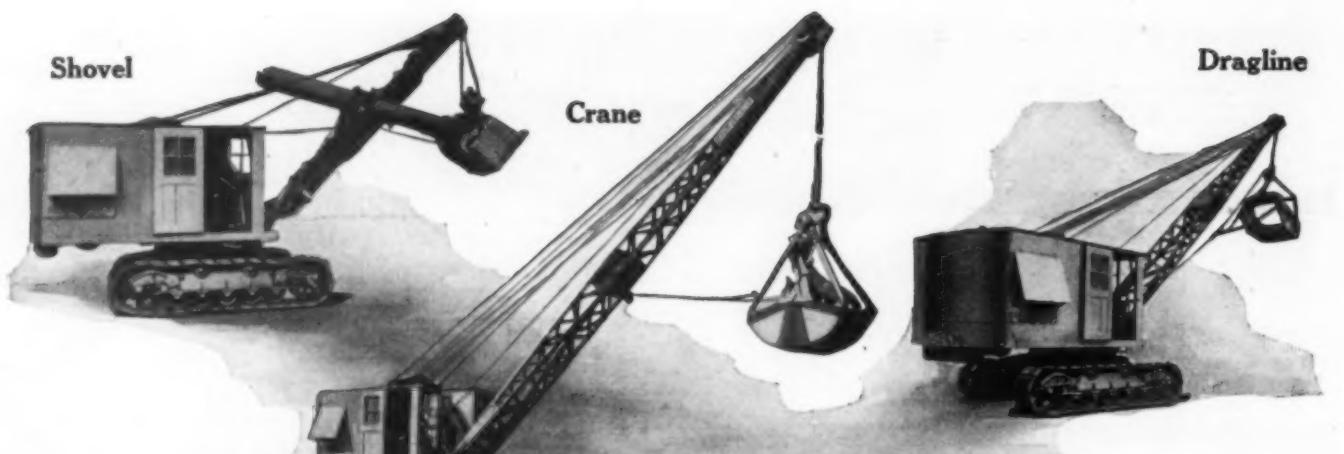
NEWARK and GROVE STS.,

HOBOKEN, N. J.

Agents in Principal Cities

European Agents—Lidgerwood Limited, Friars House, London

UNION
DOUBLE-ACTING
PILE HAMMERS



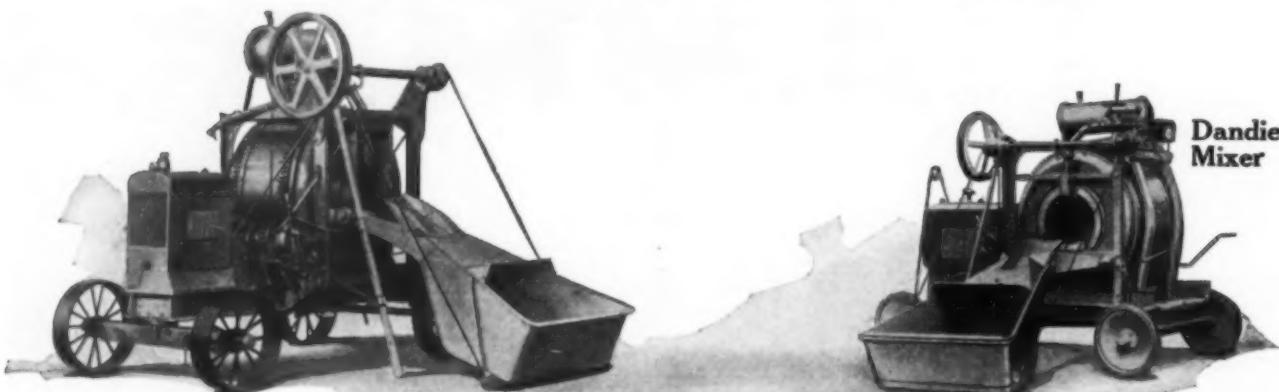
KOEHRING

KOEHRING experience, Koehring Heavy Duty construction, are two of the greatest profit factors you can put on the job!

Koehring equipment is sold through organizations that are service as well as sales organizations!

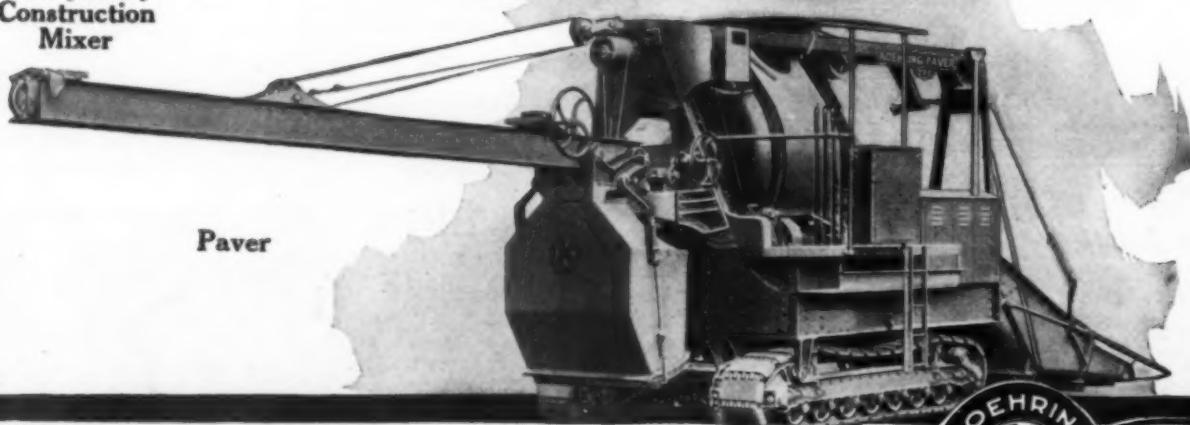
Again we say "*Know the Koehring!*"

Write for Bulletin No. 17 on any of the machines interested in.



Heavy Duty
Construction
Mixer

Dandie
Mixer



Paver

A4710-I

KOEHRING COMPANY MILWAUKEE,
PAVERS, MIXERS — GASOLINE SHOVELS, PULL SHOVELS, CRANES AND DRAGLINES WISCONSIN
Sales Offices and Service Warehouses in all principal cities
Foreign Department, Room 379, 50 Church Street, New York City
Division of National Equipment Corporation



HYSTER

TRADE MARK REGISTERED

Your
profits
increase
and
your jobs
speed up!

Use a HYSTER equipped "Caterpillar," the *self-portable* power unit, for every lift or pull. On every type of contract, big buildings, small buildings, bridges, road work, excavating, it PAYS. Gets about quickly, takes care of all the operations requiring power, has *plenty* of power, makes hard jobs easy. Investigate.

Selling agents Authorized
"Caterpillar" Dealers.

WILLAMETTE-ERSTED COMPANY

Portland
Oregon

Peoria
Illinois

2048



A black and white photograph showing a large Caterpillar tractor at the front of a long train of flatcars. The cars are loaded with logs, and the tractor is pulling them along a track. The scene is outdoors, likely in a forested or industrial area.

HYSTER
TRADE MARK REGISTERED
FOR ANY LIFT OR PULL

The historic Charleston Museum, which houses the oldest natural history collection in America, now rests on an underpinning and foundation of "INCOR" Brand Perfected High-Early-Strength Portland Cement.



75% Saving in Forms effected with "INCOR" Brand Portland Cement in new foundation work for Charleston Museum

THE thirty-year-old Charleston, S. C., Museum of Natural History is built over what was formerly a creek bottom. The building originally rested on timber sills supported on wood piles. After thirty years, however, it was found necessary to remove the wood sills, cut the piles, and place new underpinning and foundations of concrete under 900 linear feet of wall. "INCOR" Brand Perfected High-Early-Strength Portland Cement was employed.

By using "INCOR" the contractor not only completed the job two weeks sooner, but did so with a

saving of 75% in the forms that would have been required had ordinary Portland cement been used. The saving in forms alone more than offset the slight additional cost of "INCOR".

"INCOR" Brand combines the outstanding quality and uniformity of LONE STAR Cement, with the added advantage that "INCOR" produces concrete ready to use in 24 hours.

Specify LONE STAR Cement for all work where time is not the principal factor. Whenever time is important, specify "INCOR"*. *Registered U. S. Patent Office

INTERNATIONAL CEMENT CORPORATION

342 Madison Avenue, New York

S U B S I D I A R I E S



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Birmingham, Alabama

LONE STAR CEMENT CO. INDIANA, Inc.
Indianapolis, Indiana

THE CUBAN PORTLAND CEMENT CORP.
Havana, Cuba

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Philadelphia, Pennsylvania

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LONE STAR CEMENT CO. VIRGINIA, Inc.
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ARGENTINE PORTLAND CEMENT CO.
Buenos Aires, Argentina

LONE STAR CEMENT COMPANY TEXAS
Dallas and Houston, Texas

URUGUAY PORTLAND CEMENT COMPANY
Montevideo, Uruguay

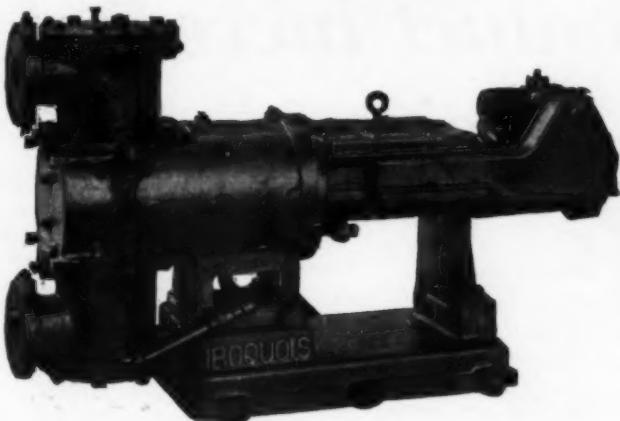
One of the world's largest cement producers—13 mills... total annual capacity 21,000,000 bbls.

IROQUOIS

Steam-Jacketed
PIPE, FITTINGS
and PUMPS

for pumping asphalt and other viscous materials that will not flow at atmospheric temperatures

Iroquois Steam-Jacketed Pipe, Fittings and Pumps give such complete satisfaction in asphalt, oil and coal-tar refineries, and plants manufacturing prepared roofing, gas, chemicals, starch, glucose, molasses, fatty acids, etc., because they are specially designed for those particular purposes.



Some of the distinctive features are:

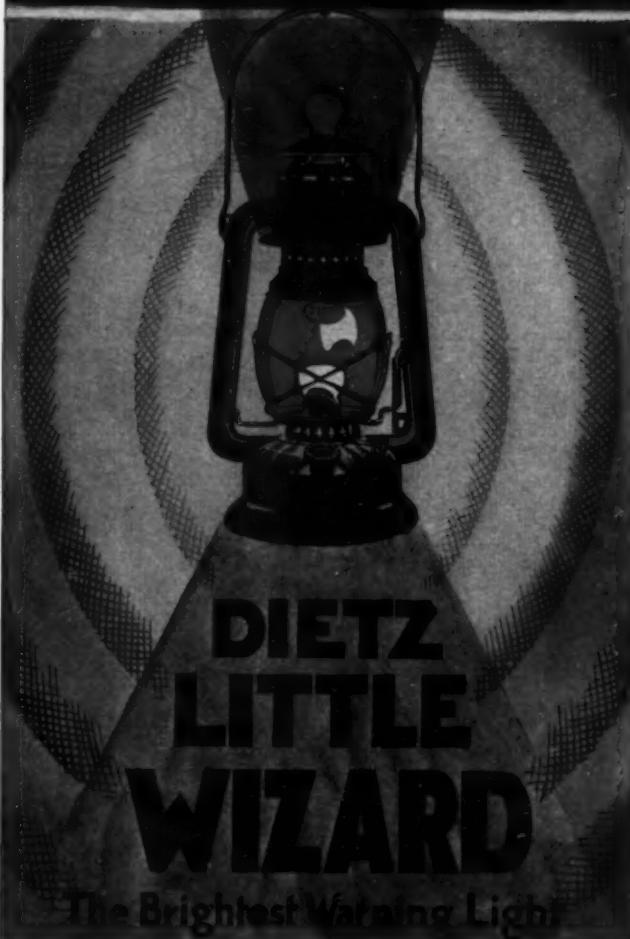
- Minimum number of working parts in contact with material being pumped.
- Large wearing surfaces to reduce wear.
- Large, straight passages for liquid being pumped.
- Simplicity of construction insures low maintenance cost.
- Ease of operation with no skilled attention.
- Steam jackets cover all moving parts—pump can be started and stopped at will without cleaning out.
- Perfect accessibility of all wearing parts.
- No springs or small, easily broken parts in valve chambers.
- Handles successfully viscous material containing large quantities of foreign matter without undue wear or operating troubles.

Write us today for full data and specifications. We will also send you information regarding the complete Iroquois Line of road-building machinery.

"Visit our booth at the 1930 Road Show to be held in the Convention Hall, Atlantic City, N. J., January 11 to 17, inclusive."

Iroquois Sales Department					
THE BARBER ASPHALT COMPANY					
PHILADELPHIA					
NEW YORK	CHICAGO	PITTSBURGH	KANSAS CITY	SAN FRANCISCO	
ST. LOUIS					

DIETZ
LANTERNS



AMONG all the confusing traffic and danger lights seen along the highways there is one—perhaps only one—which is *universally* understood.

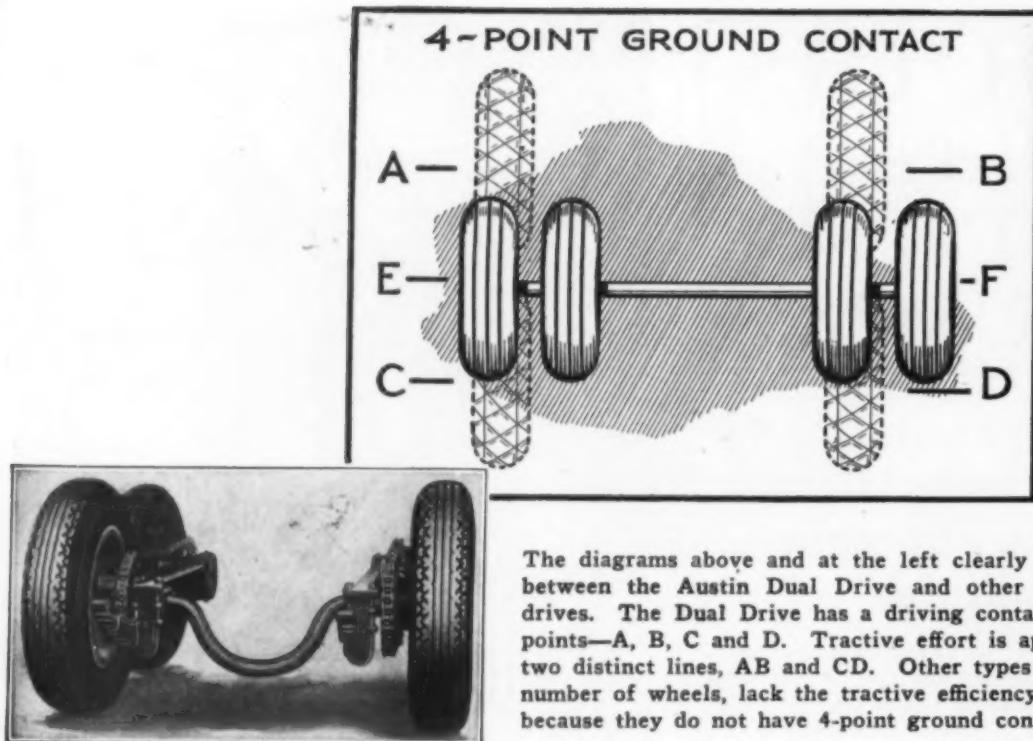
THAT is an inexpensive RED Lantern—made by DIETZ.

And because a brighter red light affords greater protection to all concerned, many highway, water works and sewer contractors use Dietz Cold Blast LITTLE WIZARD—the little lantern with the big light—always dependable.

R. E. DIETZ COMPANY
NEW YORK

Largest Makers of Lanterns in the World
FOUNDED 1840





The diagrams above and at the left clearly demonstrate the difference between the Austin Dual Drive and other so-called "double-traction" drives. The Dual Drive has a driving contact with the ground at four points—A, B, C and D. Tractive effort is applied simultaneously along two distinct lines, AB and CD. Other types of drive, regardless of the number of wheels, lack the tractive efficiency of the Austin Dual Drive because they do not have 4-point ground contact in four separate areas.

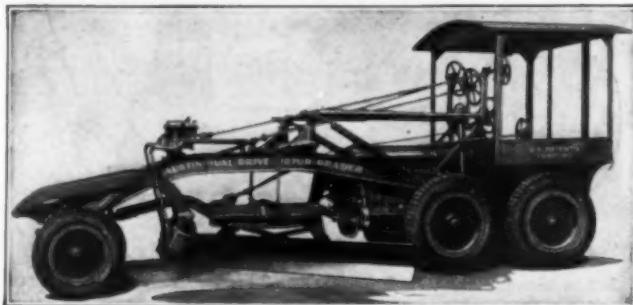
4-Point ground contact increases Dual Drive efficiency

The Austin Dual Drive Motor Grader offers more power—more traction—freedom from skidding or miring and easier handling—at no increase in operating costs!

The four great drive wheels provide more and better ground contact, being spread over four distinct areas that are entirely separate from each other.

If one or two wheels run into soft or wet spots there will still be two or three left on hard ground. In this way Austin Dual Drives always afford enough traction to carry the grader through places where two-wheel and so-called "double-traction" drives would stall and have to be dug or towed out. The forward drive wheels press down the softer ground and provide a solid footing for the rear drive wheels following immediately after.

The increased ground contact and side area of the four drive wheels provide greater resistance to side-slipping or skidding. Instead of one rear wheel to serve as the pivotal point for a skid—the Dual Drive opposes a base line several feet long between the points of contact of two drives in tandem.



State Highway Departments and others have shown a desire for Pneumatic Tires. The Austin Dual Drive Motor Grader is shown above equipped with Pneumatic Tires.

This distribution of tractive effort over a wider area means surer footing when bad spots are encountered. Because of this, Austin Dual Drive Motor Graders are out on the road more quickly after a storm and earlier in the spring.

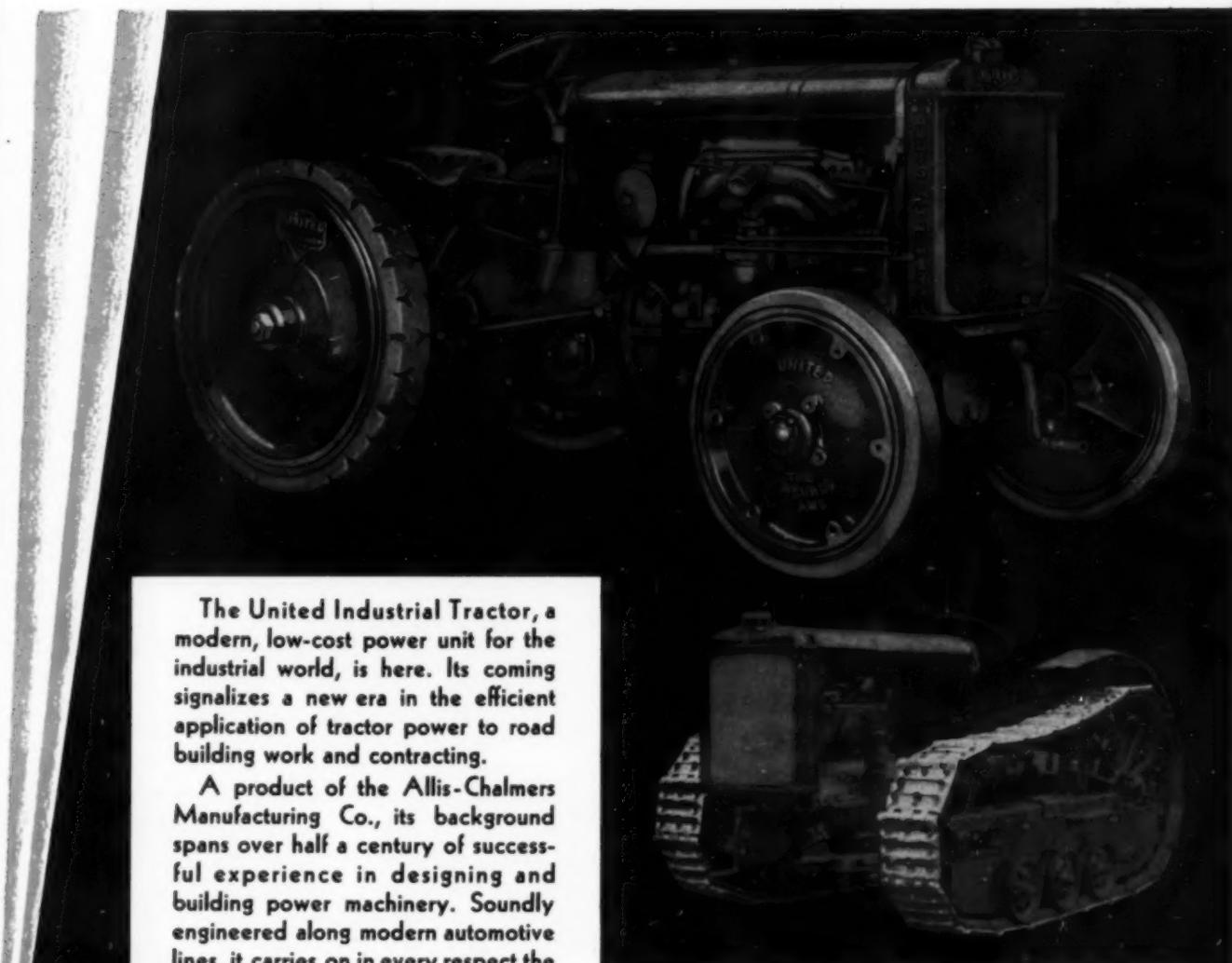
For literature and full information, write The Austin-Western Road Machinery Co., 400 North Michigan Avenue, Chicago, Illinois. Branches in principal cities.

*1930 Convention and Road Show, A.R.B.A.,
Atlantic City, N. J., January 13 to 18*

Austin-Western ROAD MACHINERY

Now ready—

the UNITED Industrial Tractor



The United Industrial Tractor, a modern, low-cost power unit for the industrial world, is here. Its coming signalizes a new era in the efficient application of tractor power to road building work and contracting.

A product of the Allis-Chalmers Manufacturing Co., its background spans over half a century of successful experience in designing and building power machinery. Soundly engineered along modern automotive lines, it carries on in every respect the Allis-Chalmers tradition of leadership.

In the United Tractor its builders have taken into account the needs of industry for a powerful and flexible unit adapted to the widest possible range of use. The result is an industrial tractor that in either wheel or crawler type readily accommodates operating equipment and provides efficient low-cost power on all jobs.

United Tractors and Equipment are sold and serviced by authorized United distributors and dealers in the United States and Canada. Investigate the United Line before you buy! Further information on request.



UNITED TRACTOR & EQUIPMENT CORP.
612 NO. MICHIGAN AVE. CHICAGO, ILLINOIS.



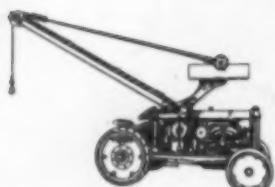
MANUFACTURING	MEMBERS
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MUSKOGEE IRON WORKS, INC.	WEHR COMPANY

See the UNITED Line at the Atlantic City Road Show—January 13-18

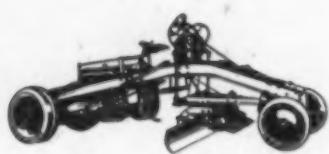
UNITED OPERATING EQUIPMENT

Specially Built for the

UNITED INDUSTRIAL TRACTOR



United Full Swing Crane
Built by
The Hughes-Keenan Co.



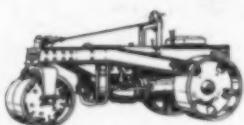
United Center Control Grader
Built by
Wehr Company



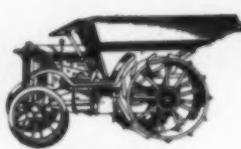
United Power Shovel
Built by
Universal Power Shovel Co.



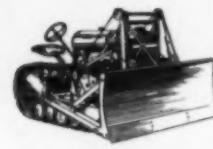
United Snow Plow
Built by
Maine Steel Products Co.



United Roller
Built by
Wehr Company



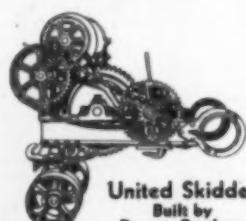
United Iron Mule
Built by
The Hughes-Keenan Co.



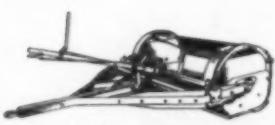
United Bulldozer
Built by
Trackson Company



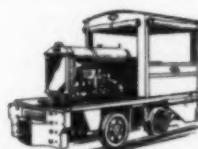
United Street Sweeper
Built by
Detroit Harvester Co.



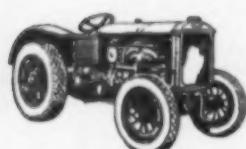
United Skidder
Built by
Dorsey Brothers



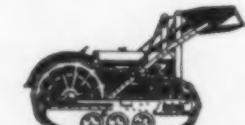
United Scraper
Built by
Perry Company



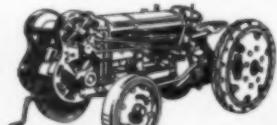
United Locomotive
Built by
Brookville Locomotive Co.



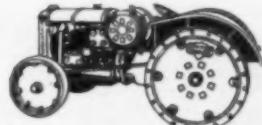
United Industrial Tractor
With Pneumatic Tires
Wheels Manufactured by
French & Hecht



United Front End Shovel
Built by
Trackson Company



United Hoist
Built by
Muskegon Iron Works, Inc.



United Arc Welder
Built by
Northwestern Mfg. Company

For use with this revolutionary tractor, there is a complete line of operating equipment built especially for the United Tractor.

Each unit is an outstanding achievement of a specialized builder of road and contracting equipment. Masterful in performance, low in first cost, economical to operate and maintain, United Tractors and Equipment are Champions of every job!

UNITED TRACTOR & EQUIPMENT CORP.
612 NO. MICHIGAN AVE.  CHICAGO, ILLINOIS.

See the UNITED Line at the Atlantic City Road Show—January 13-18

SEE THE
BAY CITY SHOVELS
AT THE
ROAD SHOW
Jan. 13-18, 1930
Main Auditorium, Space 39



MODEL R
A 26-ton, heavy duty,
full revolving $\frac{3}{4}$ -yd.
shovel, crane or drag-
line.



MODEL K
Full revolving light $\frac{3}{4}$ -
yd. convertible shovel.
Weighs 14 $\frac{1}{2}$ tons.



TRACTOR SHOVEL
Recognized leader in
its field. Operates
shovel, Trench hoe,
backfiller, etc. Weighs
10 tons.

"The Shovel is the Primary Producer"

In a recent report made by the Bureau of Public Roads they say in part, "The Shovel is the primary producer—an inferior shovel or operator is a certain guarantee that production costs will be high. The shovel should be sturdy, powerful, dependable, fast and easily operated."

This aptly describes the BAY CITY Model "R" a rugged and compact $\frac{3}{4}$ -yard convertible shovel, crane, skimmer or dragline. Weighs approximately 26 tons—light enough to move easily and without extraordinary expense—yet heavy enough to stand up under continuous service.

A 76 in. wide, Cast Steel Roller path eliminates rocking on the extra large 8 in. center pin and increases stability. Short tail swing permits operation in confined quarters—revolving overhang only 7 ft. 10 in.—heavy roller chain on Shovel crowd eliminates cables—"E-Z" control on hoisting crowd adds speed and accuracy to hoisting and spotting.

Crowd, hoist and swing count in Power Shovel operation—you get them and more in BAY CITY SHOVELS—Compare with any others of same capacity before making your choice.

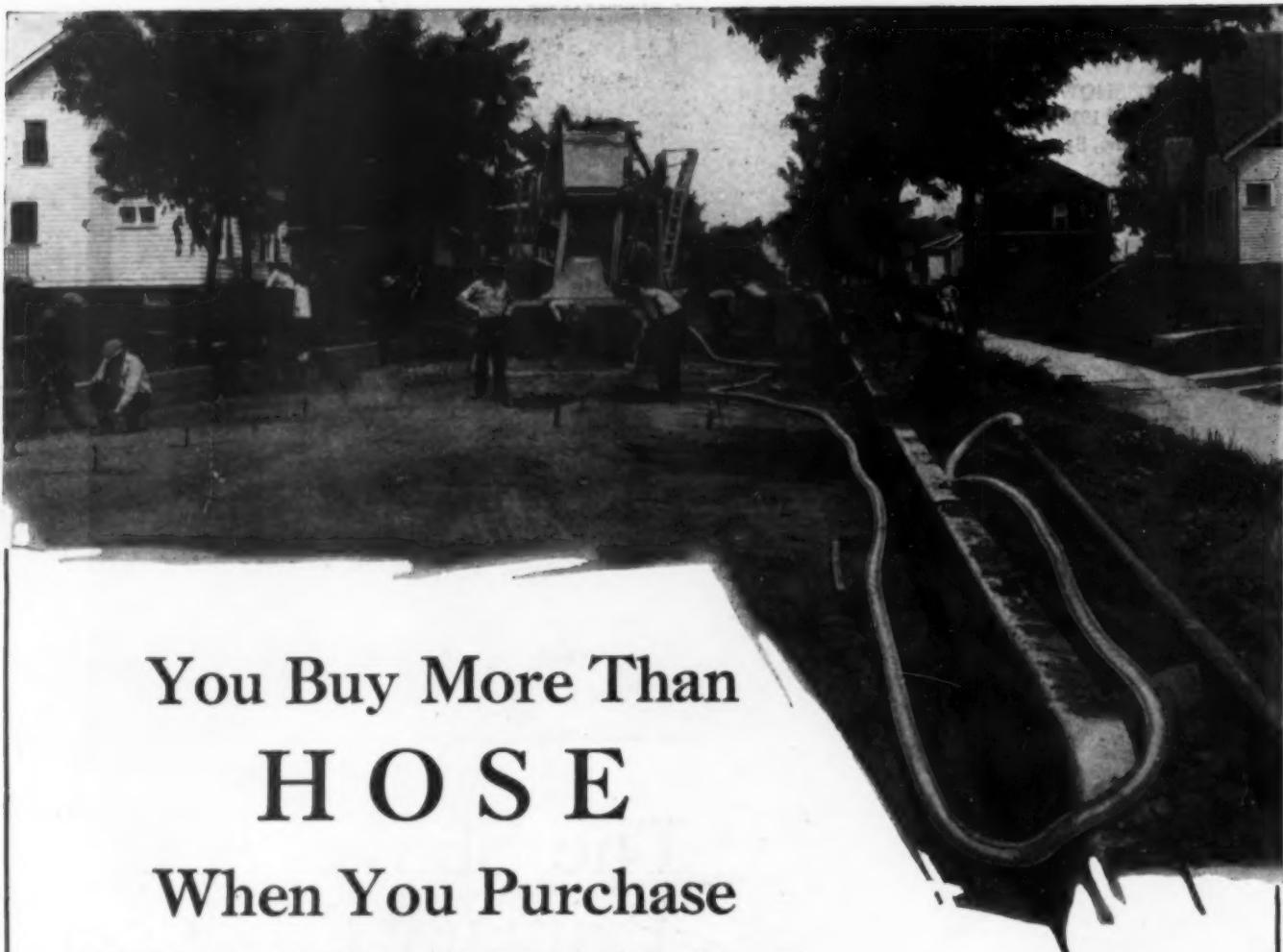
BAY CITY SHOVELS, Inc.

New York Office—302 Broadway

BAY CITY, MICH.

BAY-CITY

The BAY-CITY family of fast workers



You Buy More Than
H O S E
When You Purchase
CONTINENTAL
*Water—Steam—Air—Suction
Welding—Oil Conducting—Paint*
H O S E

You buy lowest operating cost, the advantage of near-at-hand stocks which means prompt deliveries and intelligent, interested service.

This picture shows 2-in. 5-ply Contractors Heavy Duty Red Water Hose for paving, used by Julius Porath & Son, Detroit, Mich.

Write our nearest branch for prices and information:

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885 Niagara St., Buffalo, N. Y.

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415 Michigan St., Toledo, Ohio

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CHAS. C. KERNER, 152 Chambers Street, New York, Exclusive Foreign Representative

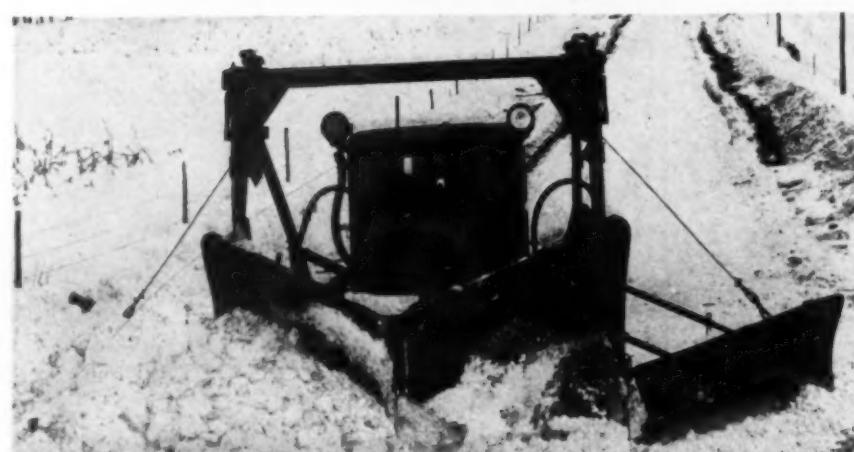
Ruts ruin roads



Prevent them—



with full-width snow-removal



Prices—f. o. b. Peoria, Illinois

TEN . . .	\$1125	TWENTY . .	\$1975
FIFTEEN . .	\$1500	THIRTY . .	\$2475
SIXTY . .	\$4300		

Caterpillar Tractor Co.

PEORIA, ILLINOIS and
SAN LEANDRO, CALIF., U. S. A.
Track-type Tractors Combines Road Machinery
(There is a "Caterpillar" Dealer Near You)

“Caterpillar” Tractors furnish surging power and sure traction for the job.

CATERPILLAR
REG. U. S. PAT. OFF.
TRACTOR



Starrett Steel Tape No. 530 gives you long, accurate service at low cost

Like all Starrett Steel Tapes, No. 530 is tough, made of finest steel.

It is easy-reading and sure-reading. The markings are bright against a dark background. Foot figures appear in front of each inch mark, so you don't have to look two places at once.

The handle snaps out at the press of a button—no stripping off of gloves these cold days—no cuts under your thumb-nail.

When you think of steel tapes, think of the Starrett No. 530. Write for the Starrett Catalog No. 24 "NF" which describes and illustrates all the Starrett Tapes and over 2500 other Starrett Tools.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS., U. S. A.

Use Starrett Tools



Starrett Reel Tape
No. 537—nickelized
frame—folding
winding-handle.



Starrett Steel Tape
No. 620—leather
covered metal case—
extension push button
handle



"3-C" Calcium Chloride Insures Maximum Strength in all Concrete Work

Curing by the Calcium Chloride method lessens the curing time and achieves increased crushing, tensile and abrasive strength in concrete products, structural concrete and concrete pavements.

Requires but two lbs. of "3-C" Calcium Chloride to each 100 lbs. of cement.

Increases production and profits!

Cold Weather Safeguard

Winter production proceeds safely with "3-C" Calcium Chloride in the "mix." Lowers the freezing point of the water, accelerates "setting," raises the temperature of the "mix" and consequently shortens the time when protection must be maintained.

Write for informative booklets.

The Columbia Products Co.
Barberton Ohio



STRUCTURAL STEEL CREATED THE SKYSCRAPER

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STEEL construction easily defeats obsolescence. In a steel building, floor areas can be increased by added stories. Adjacent additions may be conveniently built. The whole building or any part can be readily altered or remodeled for another purpose. A steel building or bridge can be kept up to date more readily with less expense than any other type of fire-resistive structure, for steel is the most flexible building material known.

Steel is the strongest, most trustworthy and most

easily applicable of all structural materials. Structural steel brings so much more speed to construction that its use often results in weeks of extra rental and added savings in interest charges. Economies in building begin with the choice of steel and continue throughout the life of the structure. Build for continued usefulness—build with steel.

A Technical Service Bureau is at the disposal of architects, engineers, owners and others who have need of any information which can be supplied through the American Institute of Steel Construction, Inc.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

The co-operative non-profit service organization of the structural steel industry of the United States and Canada. Correspondence is invited. 200 Madison Avenue, New York City. District offices in New York, Worcester, Philadelphia, Birmingham, Cleveland, Chicago, Milwaukee, St. Louis, Topeka, Dallas and San Francisco. The Institute publishes twelve booklets,

STEEL**INSURES STRENGTH****AND SECURITY**

one on practically every type of steel structure, and provides also in one volume, "The Standard Specification for Structural Steel for Buildings," "The Standard Specification for Fireproofing Structural Steel Buildings," and "The Code of Standard Practice." Any or all of these may be had without charge, simply by addressing the Institute at any of its offices.



for Heavy Timber Construction

There's just one way to tighten or loosen lag screws—*pump* them loose or *pump* them home with Lowell Lag-Screw Wrenches.

Contractors who have used ordinary open end wrenches and Lowell Lag-Screw Wrenches are strong for the Lowell reversible ratchet movement. Pumping is far quicker and easier than stopping to refit. The one is a steady movement; the other a series of constant interruptions.

Over 50 years' experience is a guarantee of careful design and best construction, but you are most interested in saving time and money on the job. Lowell Wrenches will do just this. That's why we say, "Send for complete catalog illustrating the many types and sizes." Big special wrenches for special needs.

*Send for
Catalog R*



Lowell Wrench Company
Worcester, Mass.

ACCEPT NO SUBSTITUTE

Sterling

—scientifically designed "V" bracing and riveted channel steel leg frame gives greatest strength and rigidity. A Sterling will outlast them all!



No. 6A—A.G.C. for dry material. Capacity 3½ cu. ft. All Sterling barrows have reinforced tray tops and corners. This is the most popular general type barrow.



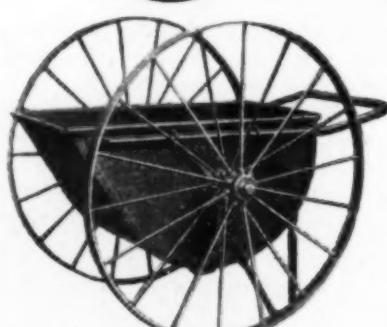
No. 31—large concrete or wet material. Capacity 4 cu. ft. struck. The easiest wheeling big load barrow made. Will outlast others in toughest work.



No. 10A—wide tray capacity, 4½ cu. ft. A.G.C. standard. Fits all contracting requirements and built to give the longest service. Solid and strong.



No. 61—extra narrow deep tray, capacity 3½ cu. ft. for concrete, mortar, etc. A type that will cost you less to use because it will last longer.



No. 6—the strongest built cart on the market. Full capacity body, no axle inside. Capacity 6 cu. ft. of 1200 lbs. Perfect balance and easiest wheeling. 42-in. wheels.

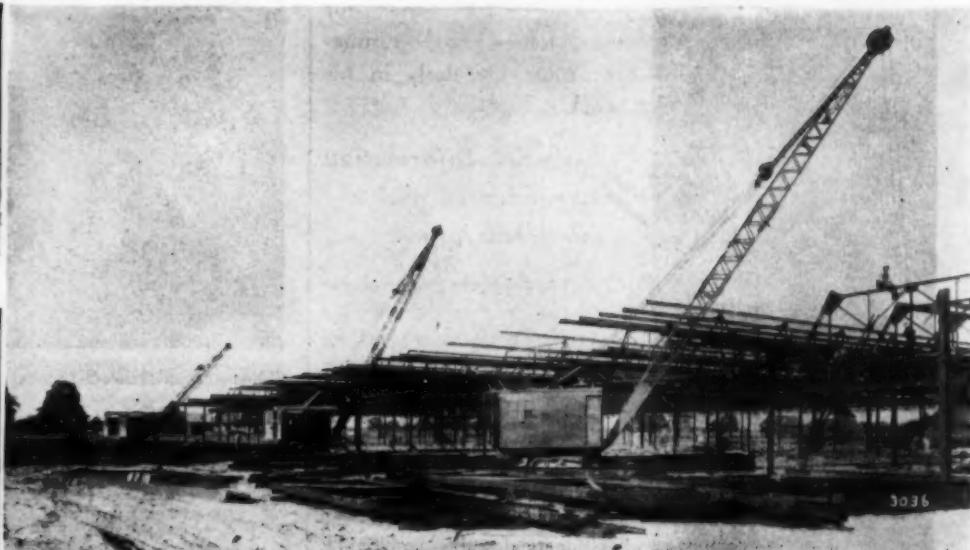
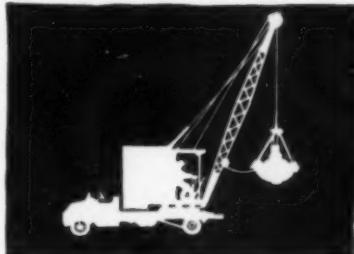
The above is but a few of the many, many Sterling types—write for complete catalog. Buy by Sterling name—leading hardware and equipment dealers have them or they can get them quickly from

our complete stock warehouses at Chicago, New York, Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis.

Manufactured for the European Markets by
Sterling Foundry Specialties, Ltd., Sterling Works, Bedford, England

STERLING WHEELBARROW COMPANY
Milwaukee Wisconsin

GOES ANYWHERE— DOES ANYTHING!



Three Browning Crawler Cranes of Levering & Carrigue, Contractors, Erecting the Steel Work of the new Pratt and Whitney Aircraft Company's building at East Hartford, Conn.

The Browning Crawler Crane is truly an all-purpose machine. You can take it anywhere, use it on any handling job and turn out more productive work at a lower cost.

In speed of operation, ease of handling and sheer mechanical strength the Browning Crawler has no equal.

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Branch Offices: NEW YORK, N.Y., CHICAGO, ILL.

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BROWNING LOCOMOTIVE, TRUCK CRAWLER CRANES

**A handy book that goes right
"on the job" with you**

BUILDING ESTIMATORS' DATA BOOK

By CHARLES F. DINGMAN
Architectural Engineer



A practical book for the estimator. It contains specific data for every type of estimate—data usable for every job—data the estimator must use daily in his work.

Essential Information in condensed and tabulated form

This handy, pocket-size volume contains condensed, accurate data for each form of estimate from excavating, sheet piling and hauling to heating, plumbing and wiring.

It is concise, standard, complete. It opens with statement and explanation of the arithmetical rules and tables involved in making quantity surveys and estimates; then proceeds to the practical application of these rules.

All of the data are based, not on money costs, but on the capacity of men and equipment.

158 pages, pocket size, flexible,
21 illus. \$2.50

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| II. Excavation, Sheet Piling
Hauling. | VIII. Interior Marble Work —
Tiling and Terrazzo. |
| III. Plain and Reinforced
Concrete. | IX. Foundation Work. |
| IV. Brick and Hollow Tile
Work. | X. Cement-Gun Work. |
| V. Stone Work and Architectural Terra Cotta. | XI. Steel and Iron Work. |
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In Lock-Bar Steel Pipe you have a joint that has demonstrated its reliability during the past 25 years in most of the important towns and cities of the United States and Canada.

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In your choice of pipe select "steel for strength and security" and Lock-Bar Steel Pipe because of the proved dependability of the joint.

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Before *Closing*
STRONG AS THE PLATE ITSELF

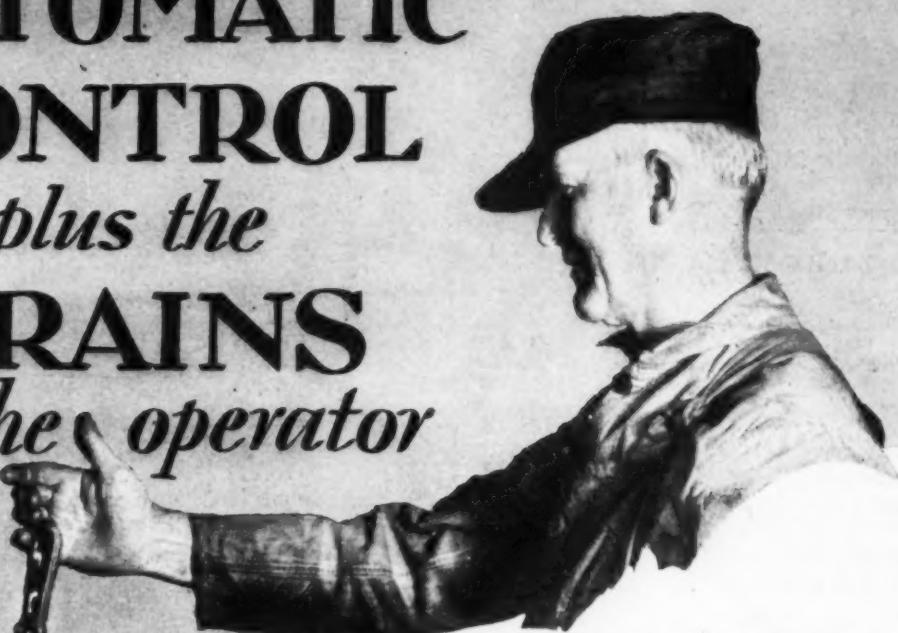
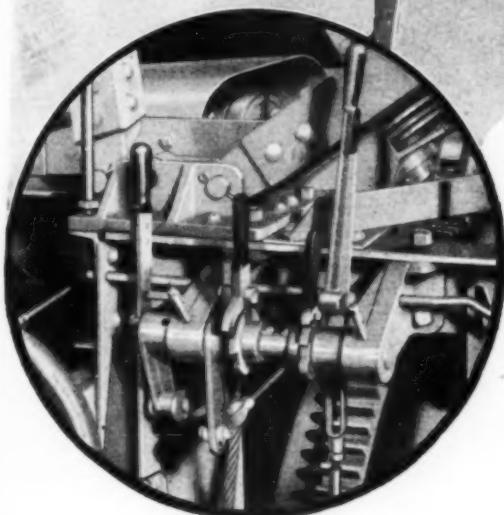
The MULTIFOOTE power operator

AUTOMATIC CONTROL

plus the

BRAINS

of the operator



THE MultiFoote Power Operator permits taking advantage of every fraction of a second. There is no delay discharging because the next load of aggregate isn't in the skip as is often the case with a mechanical mixing cycle and when the load is in ahead of time the skip can be raised and held ready for the batchmeter bell.

The power operator starts the skip and turns on the water by power. It takes but a touch of the little finger on the lever and presto—action starts instantly giving the clipped second speed that comes with power operation—but at the correct moment.

See this new MultiFoote device. Let us tell you more about it.

THE FOOTE COMPANY, Inc.
of Nunda, N. Y.

WORLD'S LARGEST EXCLUSIVE BUILDERS OF ROAD PAVERS

Frank E. Hall
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VISIT
BOOTH 211

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MULTIFOOTE
PAVER

1930
CONVENTION &
ROAD SHOW
A. R. B. A.
ATLANTIC CITY N.J.
JAN. 13-18



BAKER BULLDOZER



BAKER MANEY SCRAPERS

BAKER

EARTH MOVING EQUIPMENT

Baker Hydraulic Bulldozers for both Caterpillar and Monarch tractors are built along new lines. Greater raising height, ability to work well below track of tractor, easy operation and sturdy construction are features which recommend them to contractors. Hand-operated models of Baker Bulldozers made for the lighter model tractors.

Baker Maney Self-Loading Scrapers are the accepted earth movers for moderate hauls. Full trains turn around on twenty-foot fill. They are operated with only one or two scraper men, piling up big yardages per day. These powerful scrapers are made in three sizes— $\frac{3}{4}$, 1 and $1\frac{1}{2}$ cubic yard capacities.

See Our Exhibit, Road Show, Atlantic City, Jan. 13-18, 1930

Send for Special Bulletins—Baker Bulldozers Baker Maney Scrapers

The Baker Mfg. Co., 568 Stanford Ave., Springfield, Ill.

Cutting and Slotting timbers quicker and cheaper

Wappat Electric Handsaws saved \$700.00 on a job of cutting and slotting 400—8 x 16 inch timbers used in the erection of a Pittsburgh Bakery. Prove it for yourself on your own jobs.



WAPPAT
INCORPORATED
Division of Simonds
Saw and Steel Company

44 No. Braddock Ave.
Pittsburgh, Pa.



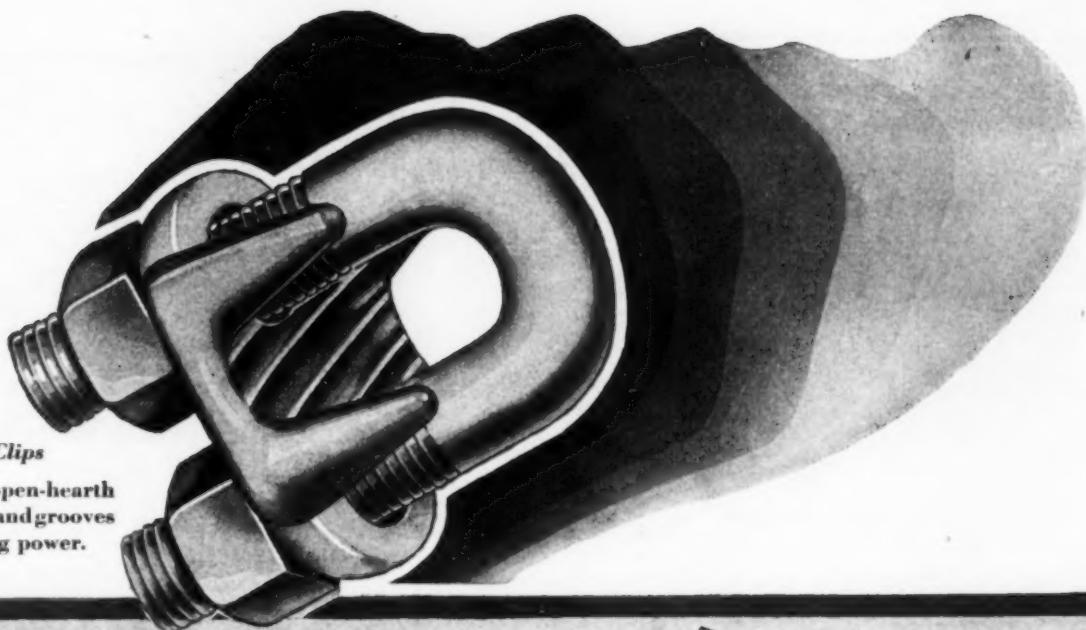
The Best Known
And Most Universally Used Roller
Go Where You Will

This preference for Buffalo-Springfields for use on both maintenance and new construction stands unquestioned. That this preference actually exists may be verified by anyone inclined to make a survey of the roller equipment now in use.



Full range of sizes, in latest models, both steam and motor driven. With or without scarifier or other attachments. Write for booklet.

THE
BUFFALO-SPRINGFIELD
ROLLER CO.
Springfield, Ohio



Wire Rope Clips

Of drop forged open-hearth steel. Concave base and grooves afford great holding power.



Wire rope fittings for critical places

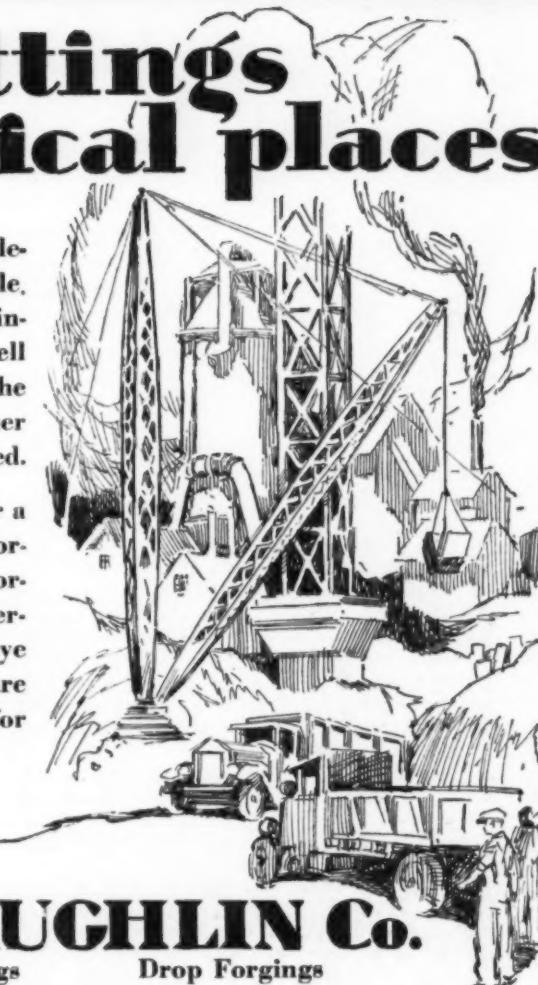
A DERRICK guy gives way bringing death and destruction... because of a flaw in a turnbuckle. Your customers cannot afford to take chances with inferior turnbuckles... or you to sell them. When you sell turnbuckles and other hardware items which carry the LAUGHLIN trademark, neither you nor your customer takes a chance. Quality and durability are assured.

We've been making hardware for critical places for a good many years. Experience has taught us the importance and "good business" of making and selling thoroughly tested items that can be relied on in any emergency. LAUGHLIN wire rope clips, missing links, eye hoist hooks, sockets, ring and eye bolts, thimbles, are made to "stand the gaff." Stock them for satisfaction.

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The THOMAS LAUGHLIN Co.

Marine Hardware

Wire Rope Fittings

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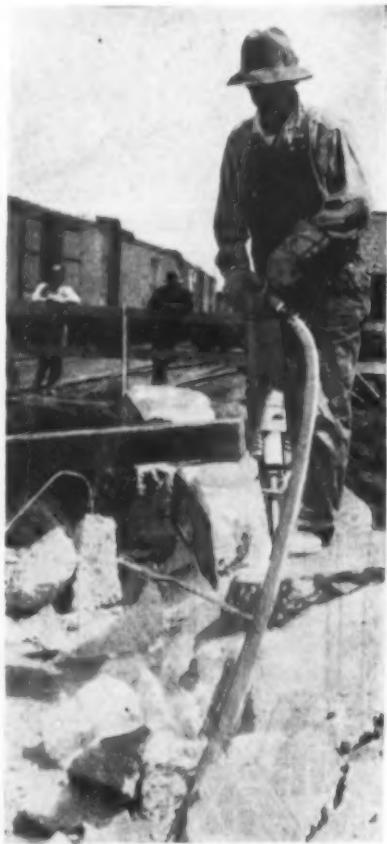
182 FORE STREET

PORLTAND, MAINE

NEW YORK . CHICAGO . SAN FRANCISCO . SEATTLE . LOS ANGELES

It takes
POWER to crack
reinforced concrete

C7
Has It!



It takes power to break reinforced concrete into chunks like this. Here's the new C7 Paving Breaker tearing down a railroad bridge on Nickel Plate Expansion Program.

Power, punch, speed distinguished the Cleveland C6 Paving Breaker. It regularly saved 50% of the cost and 75% in time over hand methods.

Greater power, punch and speed characterize the new Cleveland C7 Paving Breaker. It even eclipses the records of its powerful predecessor.

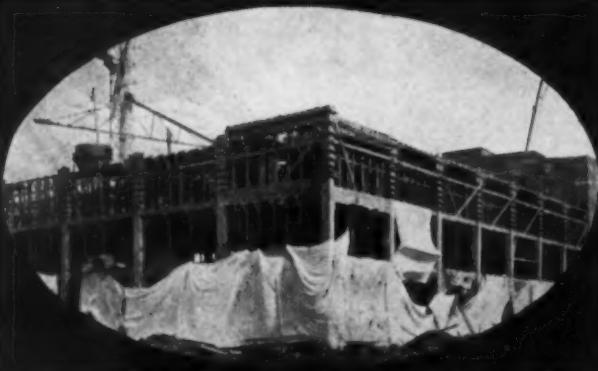
Many paving breaker users have turned to the Cleveland C7. Let us show you why with a demonstration on any job you select.

There is much of interest in our new General Catalog just off the press. Write for it.

The Cleveland Rock Drill Co.
3734 E. 78th St., Cleveland, Ohio

Branches, Agents and Service Stations in Principal Cities of the World

**CLEVELAND
ROCK DRILLS**



Fultex Waterproofed TARPAULINS & TENTS

Protection against weather-damage at low cost.
"FULTEX" Khaki Waterproof tents, tarpaulins and windbreaks—serviceable for every purpose—quality at moderate price. Burlap—in bale or made-up covers—for protecting green concrete.

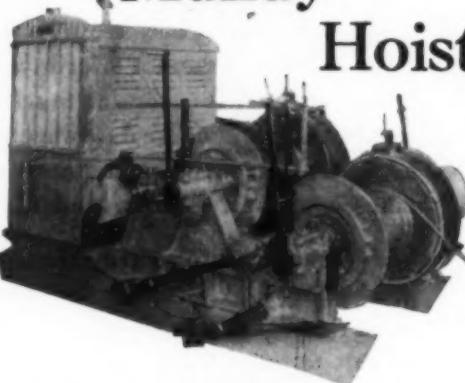
Makers of famous "SHUREDRY", "DFMP", "USAMP".

Get in touch with your nearest dealer. If he cannot supply you with "FULTEX", write us.

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Standard of the World

Gasoline—Electric—Steam

Built up to a standard
Not down to a price.

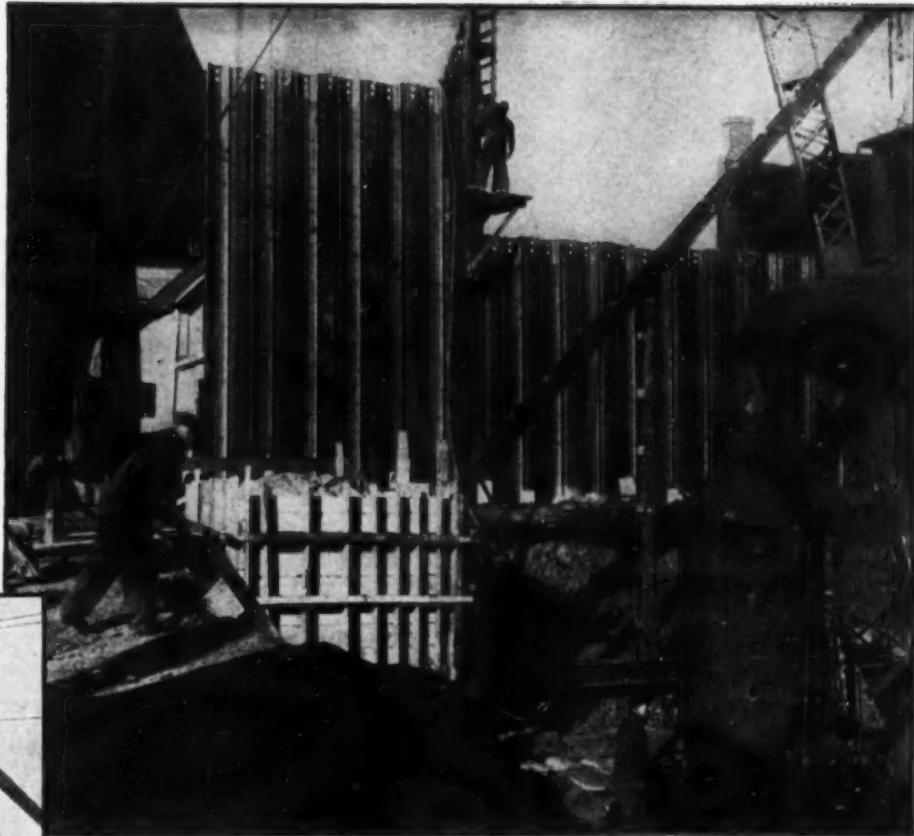
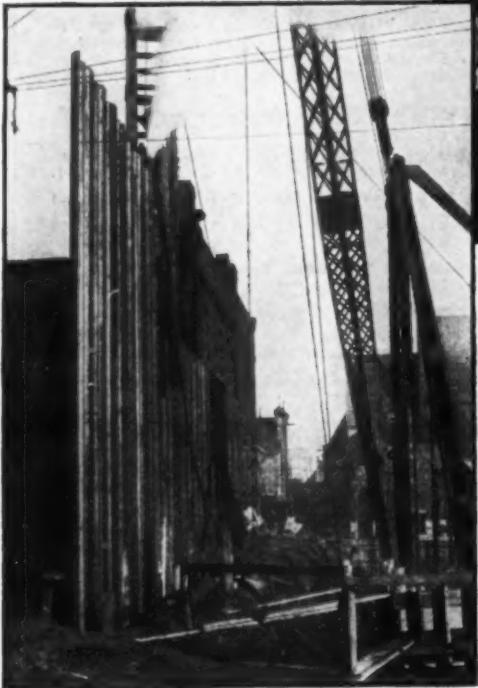
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722 Frelinghuysen Ave., Newark, N. J.

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ESTABLISHED 1869

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**CARNEGIE
PILING**
*Driven through
28 feet of...*
**HARD BLUE
CLAY**



OSHEATH the excavation for the foundation of the Bell Telephone Company Building at Des Moines, Iowa, Carnegie Steel Sheet Piling, arch web section M 106, was used. Arthur H. Neumann & Company, general contractors of that city, were exceptionally well pleased with the piling in view of the difficult driving conditions encountered. The piling, furnished in 42 foot lengths, was driven through 6 feet of soft clay, 4 feet of hard yellow clay, 28 feet of blue clay so hard that it had to be dug by pneumatic spades, and toed into 2 feet of sand and gravel without trouble of any kind. The superintendent of the work enthusiastically stated that the piling was the best he had ever used in his long experience—that it drove and pulled more easily and drove closer to a true course with very little tendency to travel ahead at the bottom. True alignment was of utmost importance in this particular job as the line of piling was only 22 inches from an adjoining foundation.

For less difficult driving conditions we have recently introduced arch web section M 111, weighing 23 pounds per square foot, with $\frac{3}{8}$ " web metal and having a section modulus of 6.4 in.³ per foot, and which maintains the other advantageous features of section M 106.

CARNEGIE STEEL COMPANY
Subsidiary of United States Steel Corporation
PITTSBURGH, PA.

46

**CARNEGIE
STEEL SHEET PILING**



A Quick Set-up for a short job

Every day small jobs on the street require temporary protecting barricades like this.

This one was made with a single board and a pair of TOLEDO HORSE frames. When the job was done, it was knocked down in just a few seconds, and tossed under the seat of a small truck all ready to set up as quickly on the next job.

**THE
TOLEDO
HORSE**
meets all
requirements

- of
- utility,** *Aside from barricades, there are hundreds of ways every user will find them convenient.*
- safety,** *They are absolutely rigid, and if necessary one pair will support twelve ton.*
- convenience** *They use any piece of handy lumber, are fully collapsible, and can be carried or stored in very small space.*
- and**
- economy** *They are indestructible and will last indefinitely, without repairs.*



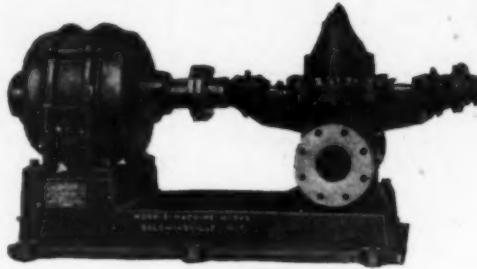
PATENT PENDING



See them at your dealer's, or write us for full details.

**THE
Toledo Pressed Steel Co.
TOLEDO :: OHIO**

MORRIS CENTRIFUGAL PUMPS



MORRIS PUMPS are made in all desirable types and sizes, motor, steam or gasoline engine, belt or chain drive, for domestic water supply, boiler feeding, circulating, irrigating, drainage, sewage disposal, hydraulic dredging, sand production and conveying, handling clean, dirty or acid water, etc.

Many popular types and sizes constantly in stock, and special designs built for unusual head, speed or capacity conditions. The advice of our Engineers on any pumping problems is free for the asking. Write at least for literature.

MORRIS MACHINE WORKS, Baldwinsville, N. Y.

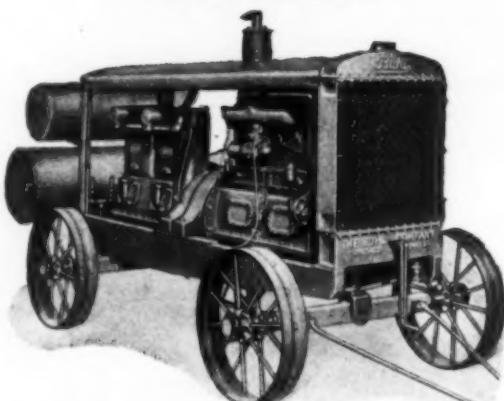
Originators of Centrifugal Pumps, both Single and Multi-Stage, and builders for practically all purposes since 1864.

Branch Offices:—New York, 26 Cortlandt Street; Philadelphia, Witherspoon Building; Cleveland, 1367 E. Sixth St.; Chicago, 217 N. Jefferson Street; Boston, 79 Milk Street; Pittsburgh, 320 Second Avenue; Detroit, 730 Fisher Bldg.; Charlotte, Realty Bldg.

Sales Representatives:—Buffalo, Kansas City, Omaha, Huntington, W. Va., Houston and in other Industrial centers.

Canada: Storey Pump & Equipment Co., Toronto

UNFAILING SERVICE LONG LIFE



Buhl COMPRESSORS

Over a period of many years Buhl Portable Compressors have established an enviable record for unflinching service and long life under the most severe working conditions.

Combined with their unusual reliability the user secures a machine equipped with the most modern improvements giving exceptional economy in operation.

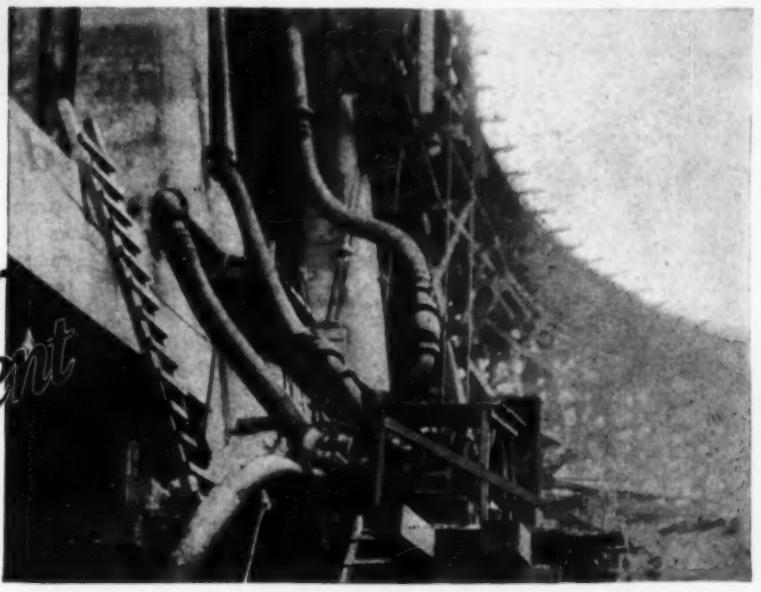
Buhl Portable Compressors are obtainable in 36, 55, 90, 100, 110, 220 and 330 cubic feet capacities with any mounting desired.

Descriptive Bulletin on Request

The Buhl Company
Old Colony Building, CHICAGO



*Contractors prefer
Electric Equipment*



These reasons were given by representative contractors, queried in a nationwide survey:

- Economy
- Few repairs
- Low upkeep
- High salvage value
- Dependability
- Best for cold-weather work
- Breakdowns minimized
- No smoke or soot
- No handling of fuel or ashes
- Reduced fire hazard
- Convenience
- Ease of handling and operating
- Compactness
- Flexibility
- Noiseless
- No water lines.

In the operation of PUMPS

This 50-hp. General Electric motor, driving a 10-inch Worthington pump, was used by Stone & Webster in the construction of the Conowingo dam.

Stone & Webster is one of the many nationally known contractors who not only employ electricity on their projects, but utilize it most effectively through G-E Motorized Power.

—and other contractors say:

"We have used to good advantage electrically driven centrifugal pumps to drain deep sewer excavations and on concrete road construction. Electricity is given preference over any other power."

—Bruno & Petitti, Boston, Mass.



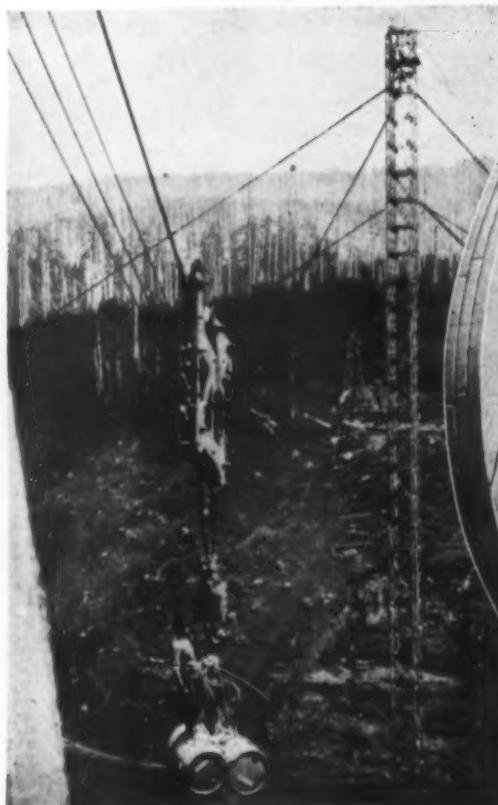
Motorized Power
-fitted to every need

200-267

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GENERAL ELECTRIC
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Yellow Strand Wire Rope



Avoid Risks!

Life and property — profit or loss — often depend upon a cable's stamina. The same amazing resilience that makes Yellow Strand Rope safe, makes it last — makes its actual cost low.

Laid up from especially drawn steel wire from the celebrated Sheffield District, of Swedish base, unrivaled for uniformly high quality. Write for Catalog 47.

**BRODERICK & BASCOM
ROPE CO.**
New York Seattle St. Louis
Portland, Ore.

N 842

An advertisement for Eisemann Magneto. It features a large industrial magneto on the left and a construction crane on the right. The Eisemann logo is at the top. Text includes "The Foremost Magneto for Construction Equipment" and "The overwhelming choice of the builders of high quality equipment. Favored by contractors everywhere." The address "EISEMANN MAGNETO CORPORATION 165 Broadway - New York" is at the bottom.

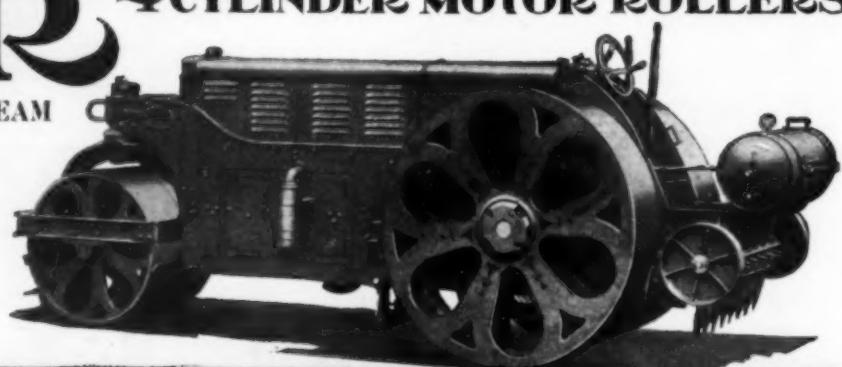
HUBER 4 CYLINDER MOTOR ROLLERS

POWERFUL AND DEPENDABLE AS STEAM
EASY TO HANDLE
SINGLE LEVER CONTROL

MADE IN FOUR SIZES

5-7-10-12
tons

SEND FOR
HUBER ROLLER CATALOG



315 E. CENTER ST. THE HUBER MANUFACTURING CO. MARION, OHIO

INSLEY *frictionless* bearing PERFORMANCE

WHAT do frictionless roller bearings and ball thrust bearings on the Half Yard Insley mean to the Insley owner?

First—that the Insley delivers more pounds of line pull per horse power of the engine.

Second—that the Insley develops the greatest possible operating speed.

Third—that it maintains this operating speed daily throughout the season with the lowest possible expenditure for wear and tear.

Fourth—that the bearings can stand the abuse and neglect of a careless operator without deteriorating.

Fifth—that the Insley operator can operate his machine at top speed and maintain that speed hour after hour throughout the day without fatigue.

These benefits combined together give the Insley owner the utmost performance at the lowest cost—and the satisfaction of owning the only half yard ball and roller bearing shovel on the market.

And yet frictionless bearings are only one of many up-to-date features you get on the Insley that place it in a class by itself.

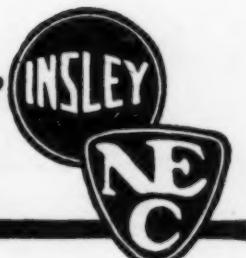
INSLEY MANUFACTURING COMPANY

Indianapolis, Indiana

Division of National Equipment Corporation



INSLEY



Annual Road Builders' Round-up Draws Near



Write to

Charles Upham, Secy.-Director
American Road Builders Assn.
National Press Building
Washington, D. C.

Every day great stacks of mail are received at the American Road Builders' Association offices, dealing with exhibits, attendance, reservations for hotels, railroads, banquets, programs, contracts, entertainment, and all the other activities of the annual Convention and Road Show which is to be held in Atlantic City, January 13-18, 1930.

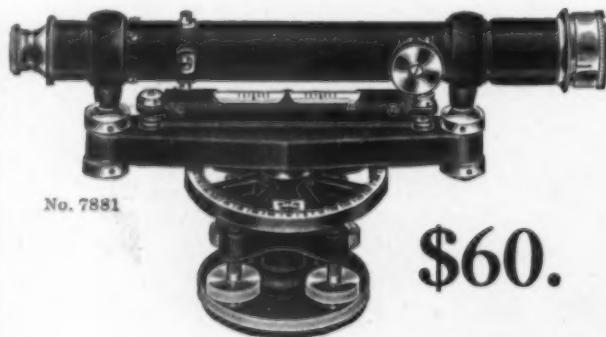
Truly, this will be the biggest event in the road-building year. There are city officials in Montana and county highway officials in California; highway contractors in Texas and highway engineers in Maine; equipment builders in Milwaukee and State highway officials in Florida who are turning their thoughts toward the *biggest event in the road-building year*.

Railroad officials as well as other transportation facilities, Hotel Committees, Entertainment Committees, in fact all the resources of the Association will help make your visit to Atlantic City a pleasant, profitable experience and education.

This is your Road Show—Attend it—good hotel accommodations—reduced rates on Special trains.

KOLESCH

"Builders' Dumpy" Level



\$60.

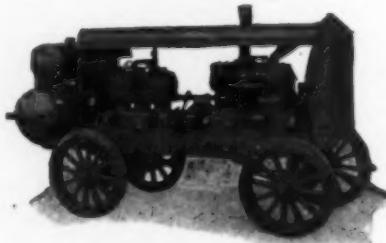
All KOLESCH Surveying Instruments are backed by the *Kolesch Iron Clad Guarantee*, which means each purchaser's money back if not satisfactory in every respect.



KOLESCH & COMPANY

138 Fulton Street
New York, N. Y.

AIR COMPRESSORS for any job

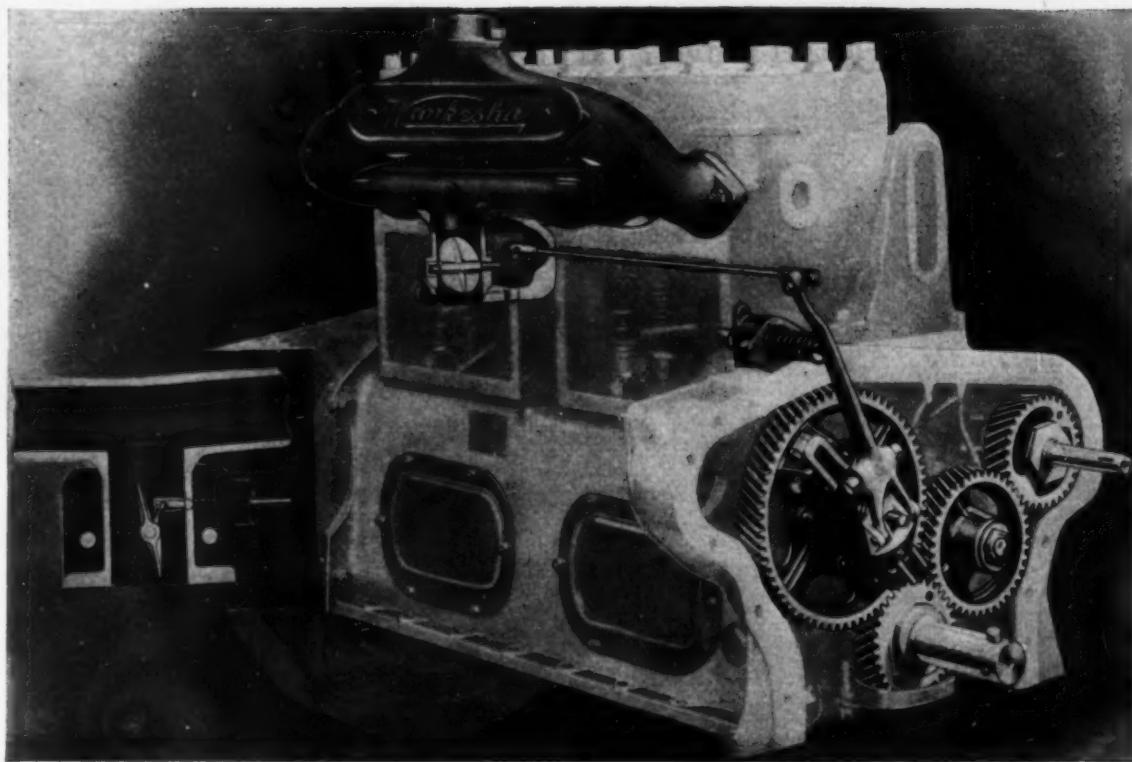


BOTH portable and stationary models in sizes ranging from $1\frac{3}{4}$ cu.ft. to 360 cu.ft.

Write for catalogue

SCHRAMM, INC.
West Chester, Pa.
Offices and Representatives in Principal Cities

Schramm

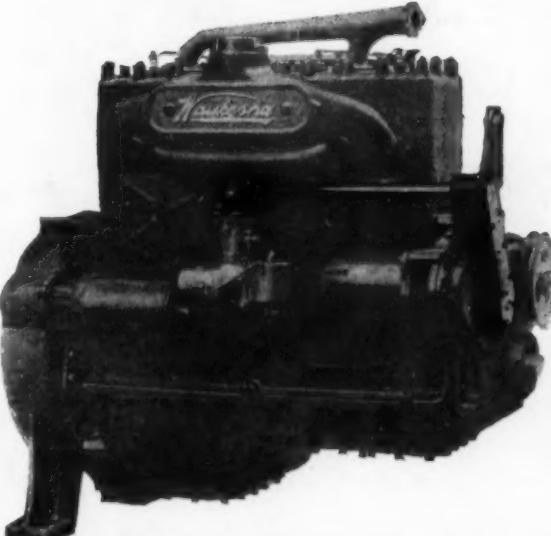


PROTECTION that is Built-In

THE governor of every Waukesha Engine is *not an accessory*. It is a protective device built with and into the engine so that it cannot be tampered with . . . and it saves both the engine and its owner from the consequences of over-speeding.

Positive and automatic in action, self-lubricating, and accurate in speed control . . . it not only prevents engine racing but assures steady, even speed at all times, from no load to engine capacity. No hair-trigger throttling is necessary . . . the governor always responds instantly to every load demand. And it prevents that alternate increase and decrease in speed known as "hunting."

The result of a basic design successfully applied and built by Waukesha for more than ten years . . . this governor is at once a safeguard and an assurance of long life.



Bulletin 556 describes the engine. Write *Industrial Equipment Division, Waukesha Motor Company, Waukesha, Wisconsin. Offices: New York, 8 West 40th Street; San Francisco, 7 Front Street.*

983

WAUKESHA ENGINES

WARCO

Road Building
Machinery gets
your jobs done.



WARCO PRODUCTS



*Graders, Wheeled Scoops,
Rear Type Crawlers for Tractors*

*Ask for our Catalog giving construction
features and specifications.*

W. A. RIDDELL COMPANY
BUCYRUS, OHIO



Cold Weather

... will soon be here, and with it frequent need for every ounce of power your truck engines can develop. Tests show that cold weather power losses due to friction in transmission and differential are cut in half by Dixon's "677" ... because it doesn't stiffen up.

Easy shifting, quiet running and minimum wear are always assured by the use of Dixon's "677." Its double film of grease and graphite cannot be forced out from between the gear teeth under any circumstances.

Only one grade—equally suitable for summer or winter. Write for Bulletin 86-G.

Joseph Dixon Crucible Company

Jersey City



New Jersey

DIXON'S
"677"
Graphite
Grease
for
Transmissions
and
Differentials



A Sensational Performer and Money Saver

THE speed, versatility, rugged construction, big yardage and low cost of the Fundom combination shovel, dumper and crane, make it a sensational performer and money saver.

It makes small jobs profitable. Fast, full $\frac{3}{4}$ circle swing, $\frac{1}{3}$ yard dipper capacity, $16\frac{1}{2}$ foot radius, gasoline power.

With Trench Hoe attachment for ditching or Boom Extension for clamshell, dragline or crane, the Fundom is an unbeatable three-in-one digging machine.

Get the details and name of nearest dealer. Address—

The Fundom Hoist & Shovel Co.

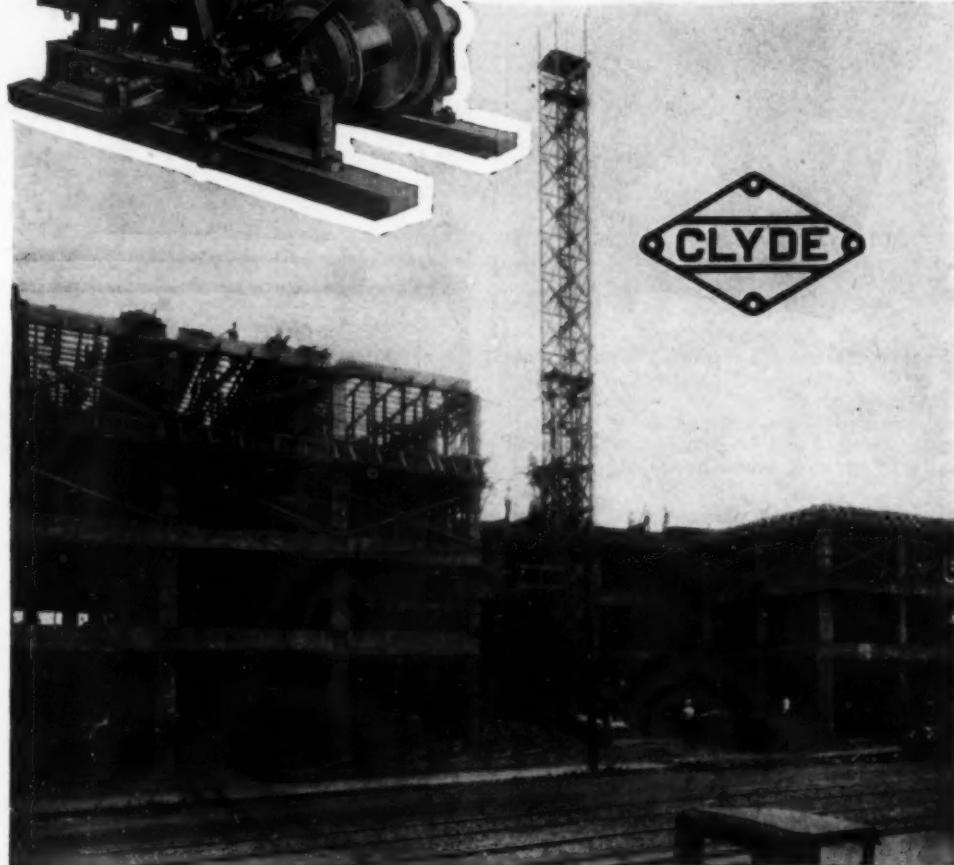
314 Central Building, Lima, Ohio

CLYDE

HOISTS & DERRICKS

big jobs and little jobs

Effectively and efficiently handled by Clyde hoists.
 Built to meet the demands of leading contractors all over the world - they may be had in sizes ranging from 4 to 200 horsepower. The photo below shows a Clyde gas hoist operating for A.B. Lanning Const. Co. on construction of an apartment building at Memphis, Tenn.



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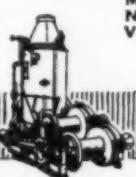
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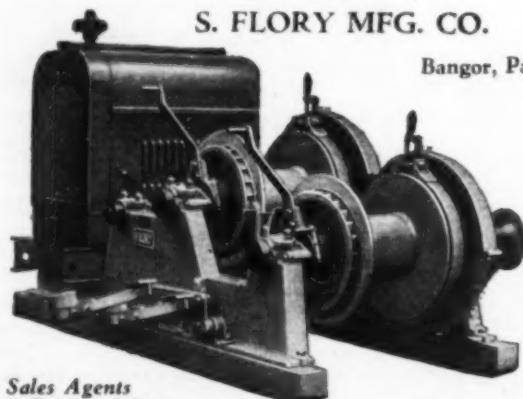
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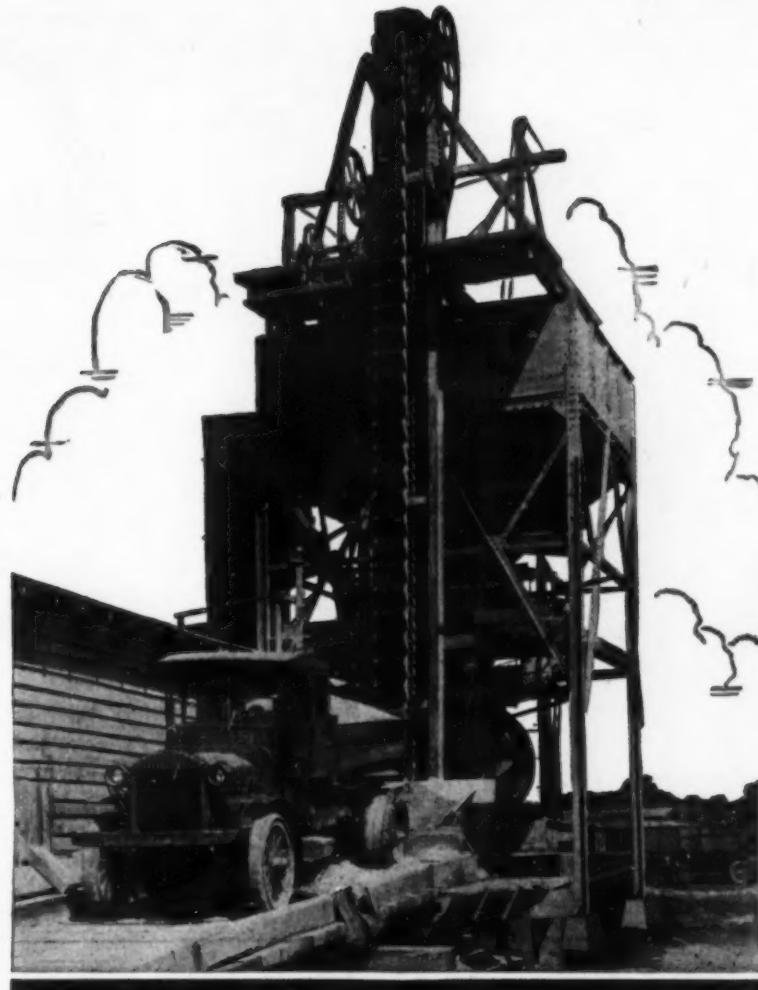
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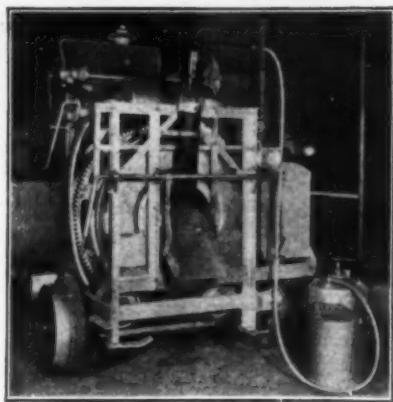
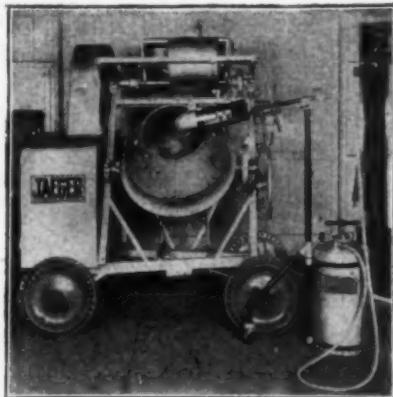
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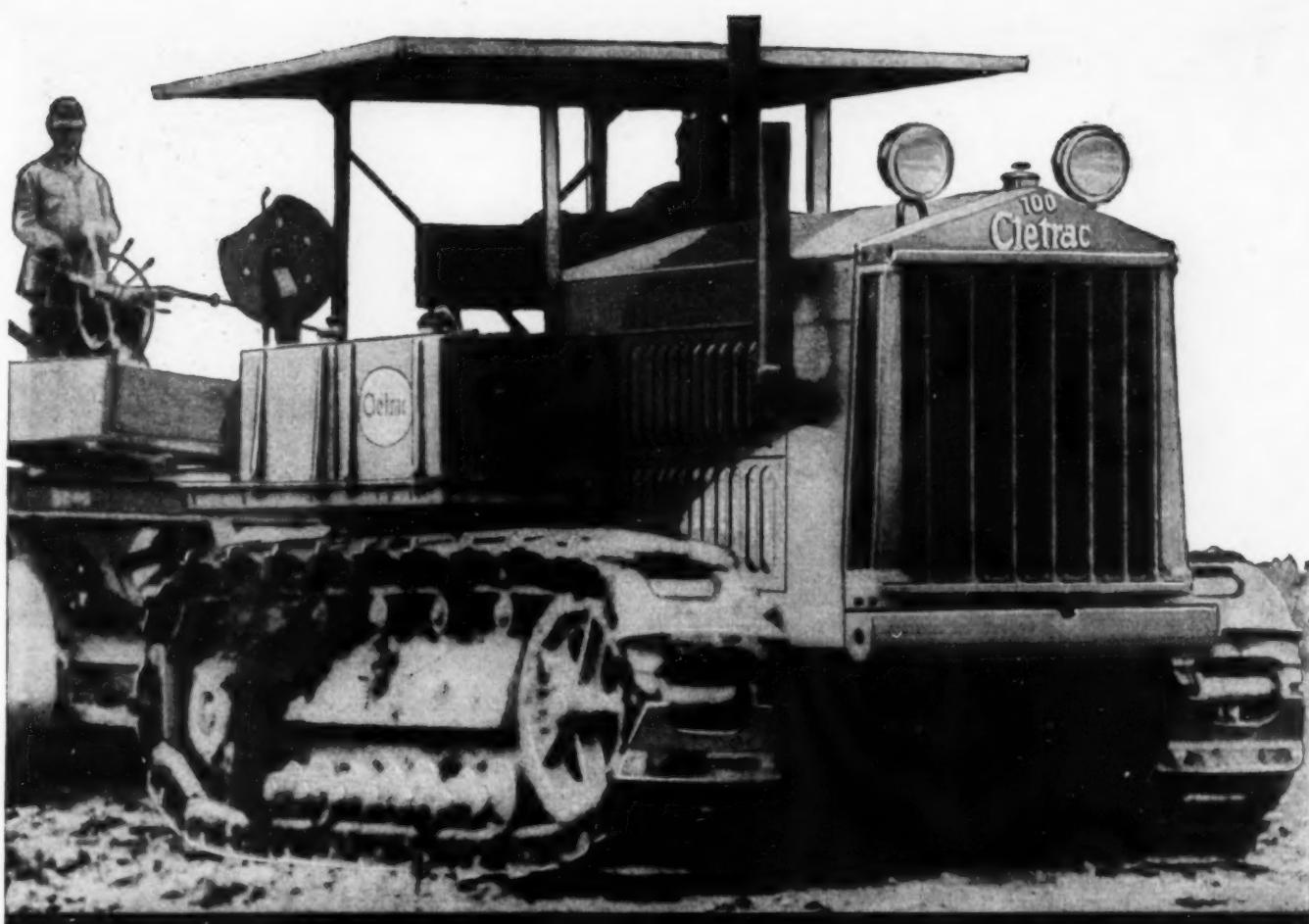
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GN-027



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"Stable-Arc" Welder

- welds easier
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- permits greater output because of the steady uniform arc throughout entire welding range, which is the result of:
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And the more you use them the more you'll like
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They're easy on the hands—fit snug—and can't
slip off for they have the hold-tight back.

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No. 108



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2. Separable from each other in circulation.

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Construction Methods

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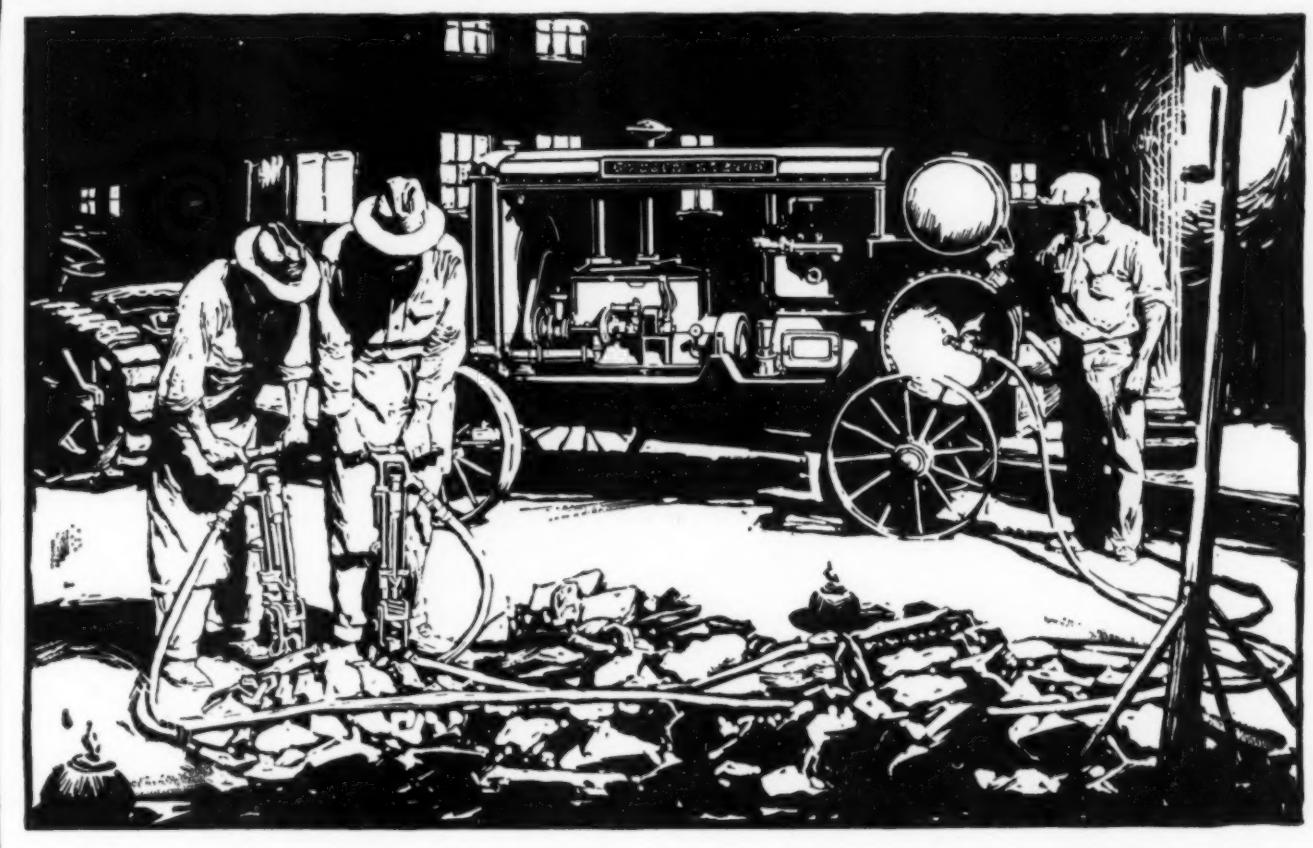
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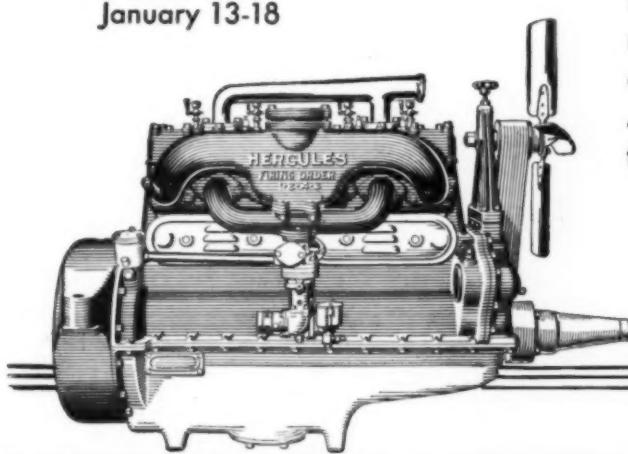
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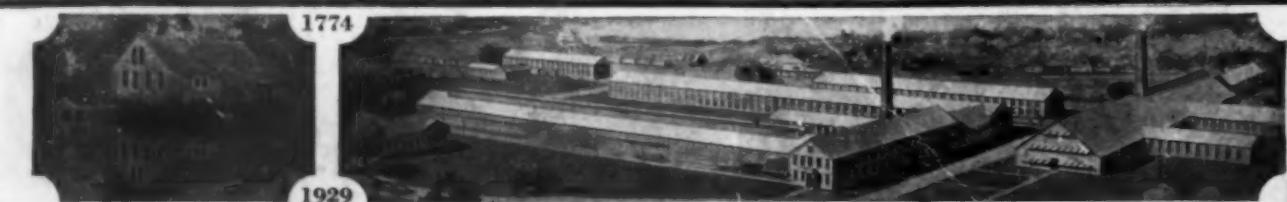


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